UNIVERSITY of HAWAI'I® SYSTEM
'Ōnaehana Kulanui o Hawai'i

Garret T. Yoshimi
Vice President for Information Technology
and Chief Information Officer

January 26, 2026

Ms. Mary Alice Evans, Director
Office of Planning and Sustainable Development
State of Hawai'i
235 South Beretania Street, 6th Floor
Honolulu, Hawai'i 96813

Subject: Draft Environmental Assessment and Anticipated Finding of No Significant Impact for the Hawaiian Islands Fiber Link (HIFL) Project; Tax Map Keys (TMKs): Kaua'i ((4) 3-4-007:003 (por.), (4) 3-7-003:007 (por.), (4) 3-7-003:017 (por.), (4) 3-7-003:999); O'ahu ((1) 1-1-015:013 (por.), (1) 9-1-016:220 (por.), (1) 9-1-026:027 (por.), (1) 9-1-026:999); Maui ((2) 3-7-001:021 (por.), (2) 3-7-001:022 (por.), (2) 3-7-001:999, (2) 3-8-007:001 (por.); (2) 3-8-007:040 (por.)); Molokai ((2) 5-3-001:003 (por.), (2) 5-3-001:011 (por.), (2) 5-3-003:013 (por.), (2) 5-3-003:014 (por.), (2) 5-3-003:999); Lāna'i ((2) 4-9-006:065 (por.), (2) 4-9-017:006 (por.), (2) 4-9-017:027 (por.)); Hawai'i Island ((3) 2-1-009:001 (por.), (3) 2-1-009:041 (por.), (3) 2-1-011:004 (por.), (3) 2-1-011:005 (por.), (3) 2-1-011:010 (por.), (3) 2-4-001:167 (por.))

Dear Ms. Evans:

On behalf of the State of Hawai'i, the University of Hawai'i (UH) Vice President for Information Technology and Chief Information Officer hereby submits this Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) for the proposed Hawaiian Islands Fiber Link (HIFL) Project. The DEA-AFONSI has been prepared pursuant to Hawai'i Revised Statutes (HRS) Chapter 343 and Hawai'i Administrative Rules (HAR) Section 11-200.1.

A copy of the DEA-AFONSI along with the other materials required for publication have been submitted via the Environmental Review Program's online form. We respectfully request that the DEA-AFONSI be published in the upcoming issue of the Environmental Notice.

Should you have any questions, please contact Lisa Kettley at Lisa.Kettley@tetratech.com or 808-441-6651.

Sincerely,

Garret T. Yoshimi
Vice President for IT and CIO

Enclosure

c: Cliff Miyake, Ocean Networks, Inc.
Lisa Kettley, Tetra Tech

2520 Correa Road, IT Center, 6th Floor
Honolulu, Hawai'i 96822
Telephone: (808) 956-3501
Fax: (808) 956-7322
An Equal Opportunity Institution

From: dbedt.opsd.erp@hawaii.gov
To: DBEDT OPSD Environmental Review Program
Subject: New online submission for The Environmental Notice
Date: Monday, February 2, 2026 1:25:06 PM

Action Name

Hawaiian Islands Fiber Link (HIFL) Project

Type of Document/Determination

Draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI)

HRS §343-5(a) Trigger(s)

- (1) Propose the use of state or county lands or the use of state or county funds
- (2) Propose any use within any land classified as a conservation district
- (3) Propose any use within a shoreline area

Judicial district

Statewide

Tax Map Key(s) (TMK(s))

Kauaʻi: (4) 3-4-007:003 (por.), (4) 3-7-003:007 (por.), (4) 3-7-003:017 (por.), (4) 3-7-003:999
Oʻahu: (1) 1-1-015:013 (por.), (1) 9-1-016:220 (por.), (1) 9-1-026:027 (por.), (1) 9-1-026:999
Maui: (2) 3-7-001:021 (por.), (2) 3-7-001:022 (por.), (2) 3-7-001:999, (2) 3-8-007:001 (por.); (2) 3-8-007:040 (por.)
Molokai: (2) 5-3-001:003 (por.), (2) 5-3-001:011 (por.), (2) 5-3-003:013 (por.), (2) 5-3-003:014 (por.), (2) 5-3-003:999
Lānaʻi: (2) 4-9-006:065 (por.), (2) 4-9-017:006 (por.), (2) 4-9-017:027 (por.)
Hawaiʻi Island: (3) 2-1-009:001 (por.), (3) 2-1-009:041 (por.), (3) 2-1-011:004 (por.), (3) 2-1-011:005 (por.), (3) 2-1-011:010 (por.), (3) 2-4-001:167 (por.)

Action type

Agency

Other required permits and approvals

Rivers and Harbors Act Section 10, Nationwide Permit 57; Endangered Species Act, Section 7 Consultation; National Historic Preservation Act, Section 106 Consultation; Magnuson-Stevens Fishery Conservation and Management Act Consultation (Essential Fish Habitat Assessment); Clean Water Act Section 401, Blanket Water Quality Certification; Coastal Zone Management Act, Federal Consistency Determination (as needed); Conservation District Use Permit; Grant of Submerged Lands Easement; Shoreline Certification (multiple); HRS Chapter 6E, Historic Preservation Review; License for Easement; Use and Occupancy Agreement; National Pollutant Discharge Elimination System General Permit Coverage; Permit to Perform Work Upon State Highway; Permit to Operate or Transport Oversize and/or Overweight Vehicles and Loads; Noise Permit/Variance; Special Management Area Use Permit (multiple); Shoreline Setback Variance (multiple); County use/zoning permit (as needed); Grading and building permits (as needed); Flood hazard permit (as needed); County roadway permit (as needed)

Proposing/determining agency

State of Hawaiʻi (represented by the University of Hawaiʻi)

Agency jurisdiction

State of Hawaiʻi

Agency contact name

Garret Yoshimi

Agency contact email (for info about the action)

gyoshimi@hawaii.edu

Email address for receiving comments

info@hifl.llc

Agency contact phone

(808) 956-3501

Agency address

2520 Correa Road, 6th Floor
Honolulu, Hawaii 96822
United States
Map It

Is there a consultant for this action?

Yes

Consultant

Tetra Tech

Consultant contact name

Lisa Kettley

Consultant contact email

lisa.kettley@tetratech.com

Consultant contact phone

(808) 441-6600

Consultant address

737 Bishop Street, Suite 2000
Honolulu, Hawaii 96813
United States
Map It

Action summary

The State of Hawai‘i, represented by the University of Hawai‘i, is proposing a subsea fiber optic cable system to improve and expand high-speed internet (broadband) access and availability to the six main Hawaiian Islands. Leveraging federal investment in technological infrastructure, the prospective interisland cable system would address a key component of the state’s Connect Kākou broadband initiative to ensure reliable and affordable access to high-speed internet to support business, education, healthcare, and other needs for Hawai‘i's residents.

The Project involves construction, operation, and maintenance of a subsea fiber optic cable with cable landing sites strategically located on Kaua‘i, O‘ahu, Molokai, Lāna‘i, Maui, and Hawai‘i Island. The subsea cable, which would have a maximum diameter of 1.1 inches, would be surface laid on the seabed within state and U.S. federal waters to interconnect the islands. For all six islands, horizontal directional drilling (HDD) would be used to install underground conduit between the onshore cable landing site and an associated offshore punchout point, thus allowing the subsea cable to make landfall by traversing beneath the shoreline. The terrestrial components at each cable landing site would include a beach manhole, underground conduit for terrestrial fiber optic cable, and a cable landing station with associated cable termination and monitoring equipment.

Reasons supporting determination

Refer to Section 7 of Draft EA

Attached documents (signed agency letter & EA/EIS)

- HIFL_DRAFT_EnvAssessment_Feb20261.pdf
- HIFL_DraftEA_UH_ERP_TransmittalLetter1.pdf

ADA Compliance certification (HRS §368-1.5):

The authorized individual listed below acknowledges that they retain the responsibility for ADA compliance and are knowingly submitting documents that are unlocked, searchable, and may not be in an ADA compliant format for publication. Audio files do not include transcripts, captions, or alternative descriptions. The project files will be published without further ADA compliance changes from ERP, with the following statement included below the project summary in The Environmental Notice: "If you are experiencing any ADA compliance issues with the above project, please contact (authorized individual submitting the project at email)."

Action location map

- HIFL_DraftEA_Shapefiles_202601281.zip

Authorized individual

Lisa Kettley

Authorized individual email

lisa.kettley@tetratech.com

Authorized individual phone

(808) 441-6600

Authorization

- The above named authorized individual hereby certifies that he/she has the authority to make this submission.

Hawaiian Islands Fiber Link

Interisland Subsea Fiber Optic Cable System

Draft Environmental Assessment

February 2026

Prepared for

3325 Paddocks Parkway, Suite 410
Suwanee, GA 30024

Prepared by

737 Bishop Street, Suite 2000
Honolulu, Hawai‘i 96813

PROJECT SUMMARY

Project Name

Hawaiian Islands Fiber Link (HIFL)

Proposing Agency

University of Hawai‘i (UH)

Project Overview

The State of Hawai‘i, represented by the UH, is proposing a subsea fiber optic cable system that would provide critical infrastructure needed to improve and expand high-speed internet (broadband) access and availability to the six main Hawaiian Islands. Leveraging federal investment in technological infrastructure, the prospective interisland cable system would address a key component of the state's *Connect Kākou* broadband initiative to ensure reliable and affordable access to high-speed internet to support business, education, healthcare, and other needs for Hawai‘i's residents. In doing so, it would also directly support specified objectives and priorities in the Hawai‘i State Plan as well as the general plans for the individual counties across the state.

The Project involves construction, operation, and maintenance of a subsea fiber optic cable system with cable landing sites strategically located on Kaua‘i, O‘ahu, Molokai, Lāna‘i, Maui, and Hawai‘i Island. The subsea cable, which would have a maximum diameter of 1.1 inches, would be surface laid on the seabed within state and U.S. federal waters to interconnect the islands. For all six islands, horizontal directional drilling (HDD) would be used to install underground conduit between the onshore cable landing site and an associated offshore punchout point, thus allowing the subsea cable to make landfall by traversing beneath the shoreline. The terrestrial components at each cable landing site would include a beach manhole (BMH), underground conduit for terrestrial fiber optic cable, and a cable landing station (CLS) with associated cable termination and monitoring equipment.

UH has engaged Ocean Networks Inc. (ONI) to address the supply, construction, operations, and maintenance aspects of the Project, including the environmental review and permitting requirements. It is anticipated that the State of Hawai‘i and ONI will form a public-private partnership, with the HIFL system owned and operated by the resulting entity (HIFL LLC).

Project Location (Cable Landing Sites)

Kaua‘i (Nukoli‘i Beach Park and Kaua‘i Community College)
O‘ahu (Barbers Point Beach Park and UH West O‘ahu / DR Fortress)
Maui (Kahului Harbor and UH Maui College)
Molokai (Molokai Yacht Club and UH Maui College Molokai Education Center)
Lāna‘i (Mānele Small Boat Harbor and UH Maui College Lāna‘i Education Center)
Hawai‘i Island (Pacific Aquaculture & Coastal Resource Center [PACRC] and UH Hilo)

Tax Map Key (TMK) and Land Ownership

Kaua‘i: (4) 3-4-007:003 (por.; UH); (4) 3-7-003:007 (por.; Garden Isle Dream LLC); (4) 3-7-003:017 (por.; Kaua‘i Beach Resort Assoc, Knickerbocker Life Ins Co, Walter T Shimoda, and Nancy Shimoda); (4) 3-7-003:999 (Kūhiō Highway ROW)
O‘ahu: (1) 1-1-015:013 (por.; Loyalty Development Co Ltd [leased to DR Fortress LLC]); (1) 9-1-016:220 (por.; UH); (1) 9-1-026:027 (por.; City and County of Honolulu); (1) 9-1-026:999 (Ola‘i Street ROW)
Maui: (2) 3-7-001:021 (por.; State of Hawai‘i [Department of Transportation [HDOT] via Executive Order]); (2) 3-7-001:022 (por.; HDOT Harbors Division via Executive Order]);

	(2) 3-7-001:999 (Kahului Beach Road ROW); (2) 3-8-007:001 (por.; County of Maui [leased to Maui Nui Botanical Gardens Inc.]); (2) 3-8-007:040 (por.; UH) Molokai: (2) 5-3-001:003 (por.; County of Maui); (2) 5-3-001:011 (por.; State of Hawai'i); (2) 5-3-003:013 (por.; UH); (2) 5-3-003:014 (por.; UH); (2) 5-3-003:999 (Alanui Kaimike Street ROW) Lāna'i: (2) 4-9-006:065 (por.; Lāna'i Resorts LLC [leased by UH]); (2) 4-9-017:006 (por.; State of Hawai'i [Division of Boating and Ocean Recreation [DOBOR] via Executive Order]); (2) 4-9-017:027 (por.; State of Hawai'i) Hawai'i Island: (3) 2-1-009:001 (por.; State of Hawai'i [UH via Executive Order]); (3) 2-1-009:041 (por.; State of Hawai'i [UH via Executive Order]); (3) 2-1-011:004 (por.; UH); (3) 2-1-011:005 (por.; Department of Hawaiian Home Lands); (3) 2-1-011:010 (por.; State of Hawai'i [County of Hawai'i via Executive Order]); (3) 2-4-001:167 (por.; State of Hawai'i)
State Land Use District	Kaua'i: Conservation (submerged and terrestrial lands), Urban, Agriculture O'ahu: Conservation (submerged lands), Urban Maui: Conservation (submerged and terrestrial lands), Urban Molokai: Conservation (submerged lands), Urban Lāna'i: Conservation (submerged and terrestrial lands), Urban Hawai'i Island: Conservation (submerged lands), Urban
County Zoning District	Kaua'i: Open Space, Agriculture, University O'ahu: General Preservation Maui: Residential, Road, Park Molokai: Interim, Public/Quasi-Public Lāna'i: Mānele Project District Hawai'i Island: Open, General Industrial, University
Special Management Area	Yes (all cable landing sites)
Required Permits and Approvals	Rivers and Harbors Act Section 10, Nationwide Permit (NWP) 57 Endangered Species Act, Section 7 Consultation National Historic Preservation Act, Section 106 Consultation Magnuson-Stevens Fishery Conservation and Management Act Consultation (Essential Fish Habitat Assessment) Clean Water Act Section 401, Blanket Water Quality Certification Coastal Zone Management Act, Federal Consistency Determination (as needed) Conservation District Use Permit Grant of Submerged Lands Easement Shoreline Certification (multiple cable landing sites) HRS Chapter 6E, Historic Preservation Review License for Easement Use and Occupancy Agreement National Pollutant Discharge Elimination System General Permit Coverage Permit to Perform Work Upon State Highway Permit to Operate or Transport Oversize and/or Overweight Vehicles and Loads Noise Permit/Variance Special Management Area Use Permit (multiple cable landing sites) Shoreline Setback Variance (multiple cable landing sites) County Use/Zoning Permit (as needed; see Table 5-2)

	Grading and Building Permits (as needed; see Table 5-2) Flood Hazard Permit (as needed; see Table 5-2) County Roadway Permits (as needed; see Table 5-2)
HRS Chapter 343 Trigger	Use of state lands and funds, use of land classified as conservation district, and use of shoreline area
Summary of Potential Impacts	To interconnect the subsea fiber optic cable with each island's telecommunication network, the Project must cross the shoreline. To avoid and minimize impacts to sensitive shoreline resources (e.g., beaches, dunes, reefs), HDD would be used to install the cable beneath the shoreline at a depth ranging between approximately 35-85 feet (varies by site). HDD is an industry standard technique that allows for trenchless installation of underground conduit. The HDD borehole would be relatively small (e.g., approximately 6 inches in diameter) and would result in a temporary and localized increase in turbidity at the offshore punchout point. Although unlikely, HDD could result in accidental release of drilling fluid (comprising a non-toxic, naturally occurring clay) to the surrounding environment; an Inadvertent Drilling Fluid Release Contingency Plan would be implemented to minimize the potential for any sort of accidental release during drilling. At each cable landing site, the BMH would be set back from the shoreline by approximately 139-350 feet (varies by site); the only Project infrastructure within each island's shoreline setback area would be the underground HDD conduit. As subsea cable systems are specifically designed for the marine environment, they are resilient to coastal flooding; regardless, the Project incorporates a minimum design standard based on the 1.1-foot sea level rise scenario, as this roughly equates to the current mid-range projection for 2050, which generally corresponds with the system's design life. The cable landfall infrastructure would be monitored on a regular basis; although not anticipated, potential inundation or erosion would be mitigated as needed. Some onshore recreational areas within each cable landing site would be temporarily displaced by construction activities; however, public access to the shoreline and nearby recreational facilities would be maintained. Similarly, during HDD and cable laying activities, ocean waters would remain open to the public, with monitoring and buffer zones around active work areas to maintain public safety. Furthermore, the Project has been specifically sited and designed to avoid potential interference or disruption of harbor facilities and operations. Installation of onshore infrastructure would result in short-term, minor construction-related impacts, including localized emissions of air pollutants and elevated noise levels due to operation of heavy equipment and vehicles; fugitive dust resulting from ground disturbance; conveyance of sediment and other pollutants via stormwater runoff; traffic related impacts due to work within or near roadways; and potential disturbance of listed wildlife species, if present. Potential impacts would be avoided and minimized through compliance with applicable regulatory requirements and implementation of measures described throughout Section 3. The Project has been sited to avoid onshore surface waters and construction would not materially change the topography or alter any landforms. Subsurface archaeological testing is being conducted as part of the historic preservation review process; any mitigation measures identified through this process would be incorporated into the Project. Similarly, recommendations of the Cultural Impact Assessment and Ka Pa‘akai Analysis would be implemented to avoid and minimize any potential impacts to

cultural resources and practices. Once constructed, all cable landfall infrastructure would be located at or below the ground surface. The only new aboveground structures to be installed as part of the Project would be CLS facilities within the UH Maui College, Molokai Education Center, and UH Hilo campuses, as well as a new stand-alone emergency generator at Kaua‘i Community College; these structures would be designed to match the surrounding campus buildings. Once installed, the Project infrastructure would have no bearing on public access and would not affect any scenic viewplanes.

The subsea cable, with a diameter of 0.6-1.1 inches, would have minimal impact on the marine environment. The cable ship and support vessels used for installation would generate noise and introduce the potential for vessel strikes to marine species; however, these activities would occur over a relatively short-term period. Furthermore, the Project would incorporate a robust set of measures, including agency-specified measures for protection of listed marine species specific to utility line installations. The cable route in nearshore waters has been designed to avoid corals to the extent practicable, based on dive surveys conducted for each cable landing site. In areas where corals occur, the cable would be hand placed by divers to minimize impact. While some corals would be impacted during installation, it is expected that impacted corals would recolonize and no permanent coral loss would occur. Additionally, the Project would incorporate efforts to provide benefits related to the coastal environment within or near the Project Area as a means to offset the effects of cable installation; this effort would be coordinated with the resource agencies, with input from the community, through the permitting process. Based on other subsea cables in similar substrates, it is anticipated that the majority of the cable would self-bury in areas of soft substrate, with segments that traverse hard bottom colonized by coral. Once installed, the cable would result in negligible impacts to marine resources.

Anticipated Determination

Finding of No Significant Impact (FONSI)

Contact Information

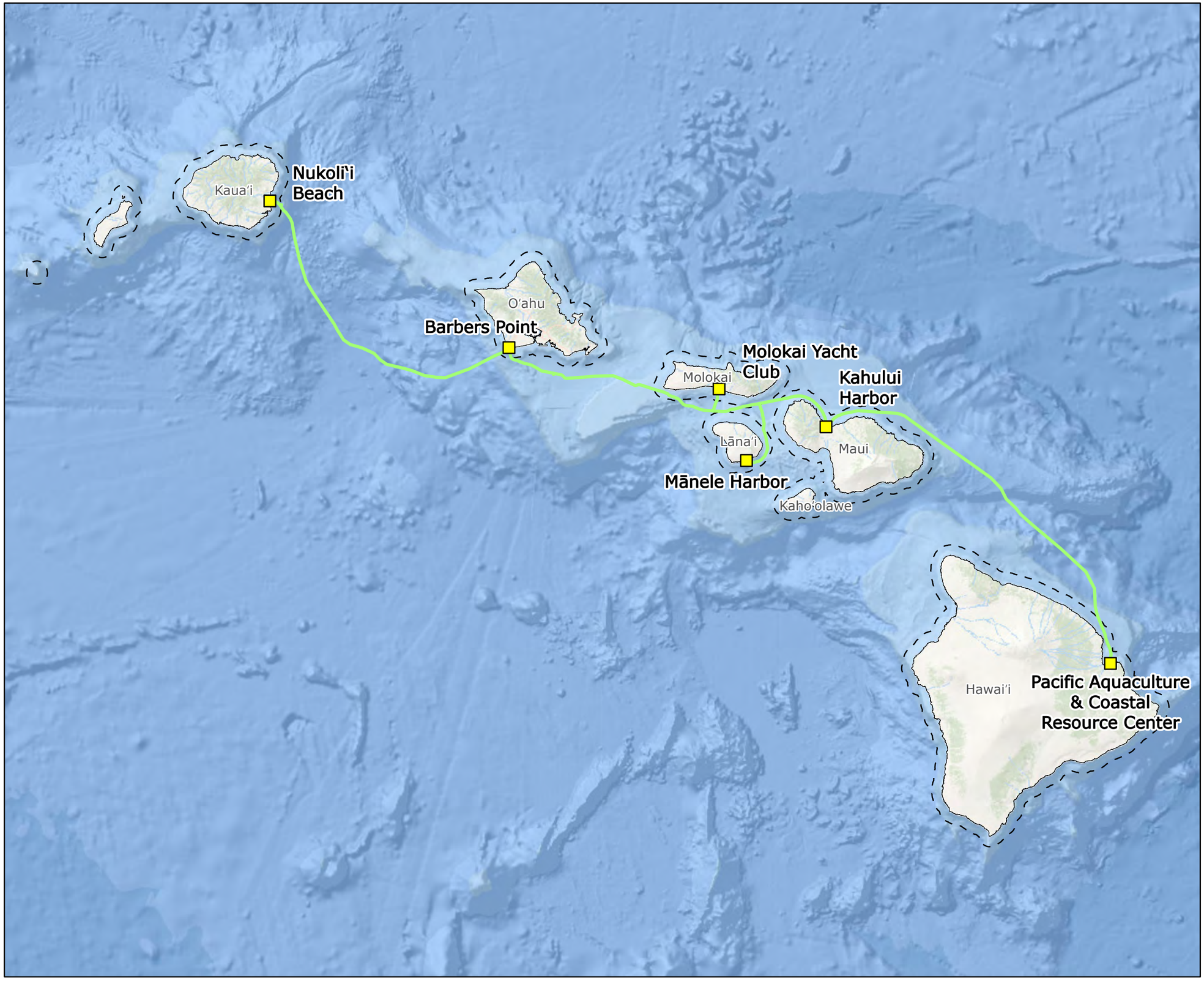
Proposing Agency:
University of Hawai‘i
2520 Correa Road
Honolulu, Hawai‘i 96822
Attn: Garret Yoshimi, Vice President for Information Technology and Chief Information Officer
gyoshimi@hawaii.edu

Partnering Entity:
Ocean Networks Inc.
3325 Paddocks Parkway, Suite 410
Suwanee, Georgia 30024
Attn: Cliff Miyake
cliff.miyake@oceannetworks.com

Agent:
Tetra Tech
737 Bishop Street, Suite 2000
Honolulu, Hawai‘i 96813
Attn: Lisa Kettley, Senior Planner
lisa.kettley@tetratech.com

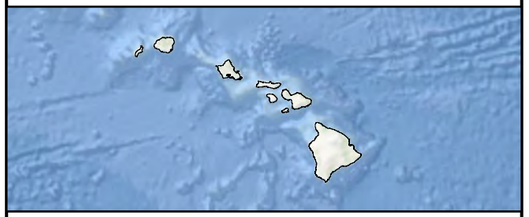
Hawaiian Islands Fiber Link

Figure ES-1
Project Overview



- Cable Landing Site
- Subsea Cable
- State Waters Limits (3 nautical miles)

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 40 80 120
Kilometers

0 20 40 60
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, NOAA, Esri, et. al.

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\1_2_ProjectOverviews\ONI_HIFL_DraftEA_ProjectOverview_20251112.aprx

Hawaiian Islands Fiber Link

Figure ES-2.1
Kaua'i Cable Landing Site



Detailed Map of Cable Landfall

See Detailed Map of Cable Landfall

Hanamā'ulu

Kūhiō Hwy

Kapule Hwy

Līhu'e

Kaumuali'i Hwy

See Detailed Map of Cable Landing Station



Detailed Map of Cable Landing Station

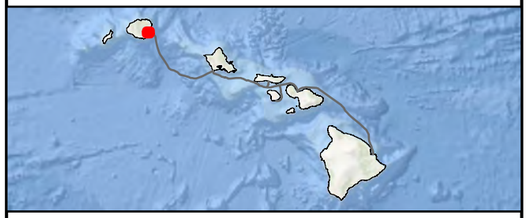
Proposed Project Infrastructure

- Project Area
- TMK Parcel
- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 1)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System
- Third-Party Underground Conduit

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1 1.5 2
Kilometers

0 2,000 4,000
Feet

N W E S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\3_Overview_CableLandingSites\ONI_HIFL_DraftEA_Overview_CableLandingSites_20251112.aprx

Hawaiian Islands Fiber Link

Figure ES-2.2
O'ahu Cable Landing Site



Detailed Map of Cable Landfall

- Project Area
- TMK Parcel

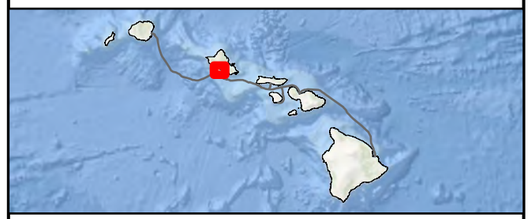
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Utility Access Point
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 1)
- Subsea Cable (Segment 2)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1 2 4
Kilometers

0 5,000 10,000
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_ DraftEA\3_Overview_Cable\Overview_CableLandingSites\ONI_HIFL_DraftEA_Overview_CableLandingSites_20251112.aprx

Hawaiian Islands Fiber Link

Figure ES-2.3
Maui Cable Landing Site



Detailed Map of Cable Landfall

See Detailed Map of Cable Landfall

Kahului Harbor
(2)3-7-001:022

Lower Main St

Wailuku

See Detailed Map of Cable Landing Station

W Ka'ahumanu Ave

Hoʻoapiilani Hwy

Kahului



Detailed Map of Cable Landing Station

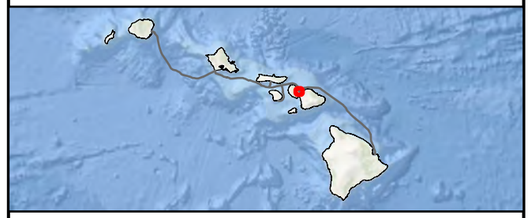
Proposed Project Infrastructure

- Project Area
- TMK Parcel
- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1
Kilometers

0 1,000 2,000
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 01/2026

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\3_Overview_CableLandingSites\ONI_HIFL_DraftEA_Overview_CableLandingSites_20260119.aprx

Hawaiian Islands Fiber Link

Figure ES-2.4
Molokai Cable Landing Site



Detailed Map of Cable Landfall



Detailed Map of Cable Landing Station



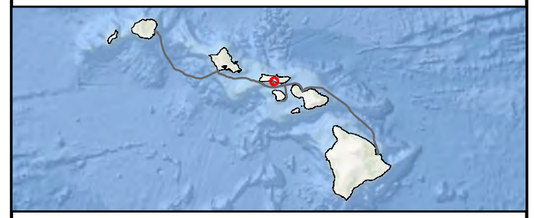
Proposed Project Infrastructure

- Project Area
- TMK Parcel
- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2A)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.2 0.4 0.6
Kilometers

0 500 1,000
Feet

N W E S

Prepared For: OOI Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\3_Overview_CableLandingSites\ONI_HIFL_DraftEA_Overview_CableLandingSites_20251112.aprx



Detailed Map of Cable Landfall

Hawaiian Islands Fiber Link

Figure ES-2.5
Lānaʻi Cable Landing Site

- Project Area
- TMK Parcel

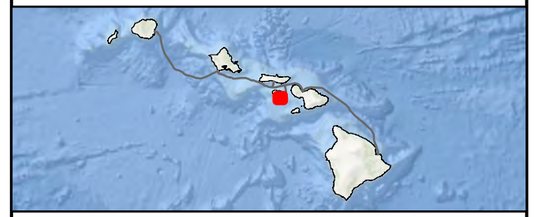
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2B)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1 2
Kilometers

0 3,000 6,000
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\3_Overview_CableLandingSites\ONI_HIFL_DraftEA_Overview_CableLandingSites_20251112.aprx

Hawaiian Islands Fiber Link

Figure ES-2.6
Hawai'i Island Cable Landing Site



- Project Area
- TMK Parcel

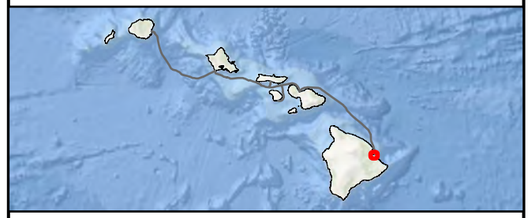
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.25 0.5 1
Kilometers

0 1,500 3,000
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 01/2026

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\3_Overview_CableLandingSites\ONI_HIFL_DraftEA_Overview_CableLandingSites_20260119.aprx

Table of Contents

PROJECT SUMMARY

1 INTRODUCTION 1-1

1.1 Background 1-1
1.2 Project Purpose and Need 1-3
1.3 Requirements for Environmental Review 1-4

2 DESCRIPTION OF PROPOSED PROJECT 2-1

2.1 Project Overview 2-1
2.2 Siting and Design Refinement Process 2-2
2.2.1 Site Selection and Routing 2-2
2.2.2 Design Refinement 2-3
2.3 Project Components 2-4
2.3.1 Subsea Cable 2-4
2.3.2 Cable Landfall 2-5
2.3.3 Beach Manhole 2-7
2.3.4 Terrestrial Cable 2-8
2.3.5 Cable Landing Station 2-9
2.4 Cable Landing Sites 2-10
2.4.1 Kauaʻi 2-10
2.4.2 Oʻahu 2-11
2.4.3 Maui 2-13
2.4.4 Molokai 2-14
2.4.5 Lānaʻi 2-15
2.4.6 Hawaiʻi Island 2-16
2.5 Project Construction 2-17
2.5.1 Site Safety and Environmental Compliance 2-17
2.5.2 Site Preparation 2-17
2.5.3 Onshore Equipment Transport and Delivery 2-18
2.5.4 Horizontal Directional Drilling 2-18
2.5.5 Onshore Construction 2-19
2.5.6 Subsea Cable Installation 2-21
2.5.7 Site Access During Construction 2-22
2.6 Project Operation and Maintenance 2-23
2.7 Cable System Retirement 2-23

2.8 Project Cost 2-24
2.9 Project Schedule 2-24
3 AFFECTED ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES 3-1
3.1 Climate and Climate Change 3-1
3.1.1 Affected Environment 3-1
3.1.2 Potential Impacts and Mitigation Measures 3-2
3.2 Geology and Soils 3-5
3.2.1 Affected Environment 3-5
3.2.2 Potential Impacts and Mitigation Measures 3-11
3.3 Natural Hazards 3-12
3.3.1 Affected Environment 3-12
3.3.2 Potential Impacts and Mitigation Measures 3-14
3.4 Onshore Water Resources 3-16
3.4.1 Affected Environment 3-16
3.4.2 Potential Impacts and Mitigation Measures 3-21
3.5 Marine Water Quality 3-24
3.5.1 Affected Environment 3-24
3.5.2 Potential Impacts and Mitigation Measures 3-25
3.6 Marine and Nearshore Biological Resources 3-27
3.6.1 Affected Environment 3-28
3.6.2 Potential Impacts and Mitigation Measures 3-41
3.6.3 Impact Avoidance and Minimization Measures 3-50
3.7 Terrestrial Biological Resources 3-56
3.7.1 Affected Environment 3-56
3.7.2 Potential Impacts and Mitigation Measures 3-70
3.7.3 Impact Avoidance and Minimization Measures 3-74
3.8 Archaeological and Historic Resources 3-76
3.8.1 Affected Environment 3-76
3.8.2 Potential Impacts and Mitigation Measures 3-82
3.9 Cultural Resources and Traditional and Customary Practices 3-85
3.9.1 Affected Environment 3-86
3.9.2 Potential Impacts and Mitigation Measures 3-94
3.9.3 Ka Paʻakai Analysis 3-99
3.10 Air Quality 3-103
3.10.1 Affected Environment 3-103

3.10.2 Potential Impacts and Mitigation Measures 3-104
3.11 Noise 3-105
3.11.1 Affected Environment 3-105
3.11.2 Potential Impacts and Mitigation Measures 3-108
3.12 Utility Infrastructure 3-111
3.12.1 Affected Environment 3-111
3.12.2 Potential Impacts and Mitigation Measures 3-113
3.13 Harbor Facilities and Marine Navigation 3-116
3.13.1 Affected Environment 3-116
3.13.2 Potential Impacts and Mitigation Measures 3-118
3.14 Traffic and Transportation 3-121
3.14.1 Affected Environment 3-121
3.14.2 Potential Impacts and Mitigation Measures 3-123
3.15 Public Facilities and Services 3-125
3.15.1 Affected Environment 3-125
3.15.2 Potential Impacts and Mitigation Measures 3-126
3.16 Recreational Resources 3-127
3.16.1 Affected Environment 3-127
3.16.2 Potential Impacts and Mitigation Measures 3-130
3.17 Scenic and Visual Resources 3-132
3.17.1 Affected Environment 3-132
3.17.2 Potential Impacts and Mitigation Measures 3-135
3.18 Socioeconomic Resources 3-136
3.18.1 Affected Environment 3-136
3.18.2 Potential Impacts and Mitigation Measures 3-139
3.19 Indirect and Secondary Impacts 3-140
3.20 Cumulative Impacts 3-140

4 ALTERNATIVES TO PROPOSED PROJECT 4-1

4.1 No Action Alternative 4-1
4.2 Use of Alternative Technologies 4-1
4.3 Alternative Cable Route and Landing Sites 4-2
4.4 Alternative Project Size 4-3
4.5 Delayed Implementation 4-3

5 CONSISTENCY WITH APPLICABLE REGULATIONS, PLANS, AND POLICIES 5-1

5.1 Federal 5-1

5.1.1 Rivers and Harbors Act 5-1
5.1.2 Clean Water Act 5-2
5.1.3 Endangered Species Act 5-3
5.1.4 National Historic Preservation Act 5-4
5.1.5 Magnuson-Stevens Fishery Conservation and Management Act 5-4
5.1.6 Coastal Zone Management Act 5-5
5.2 State of Hawai‘i 5-5
5.2.1 Hawai‘i State Plan (HRS Chapter 226) 5-5
5.2.2 State Environmental Policy (HRS Chapter 344) 5-14
5.2.3 State Land Use Law (HRS Chapter 205) 5-17
5.2.4 Coastal Zone Management Program (HRS Chapter 205A) 5-18
5.2.5 Conservation District (HRS Chapter 183C) 5-31
5.2.6 Hawaiian Homes Commission Act 5-34
5.3 Kaua‘i County 5-35
5.3.1 Kaua‘i General Plan 5-35
5.3.2 Līhu‘e Community Plan 5-38
5.3.3 Comprehensive Zoning Ordinance 5-40
5.3.4 Special Management Area 5-41
5.3.5 Shoreline Setback 5-41
5.4 City and County of Honolulu 5-42
5.4.1 O‘ahu General Plan 5-42
5.4.2 ‘Ewa Development Plan 5-45
5.4.3 Land Use Ordinance 5-48
5.4.4 Special Management Area 5-48
5.4.5 Shoreline Setback 5-49
5.5 Maui County 5-50
5.5.1 Maui County General Plan 5-50
5.5.2 Zoning Ordinance 5-71
5.5.3 Special Management Area 5-72
5.5.4 Shoreline Setback 5-73
5.6 Hawai‘i County 5-75
5.6.1 Hawai‘i County General Plan 5-75
5.6.2 Hilo Development Plan 5-80
5.6.3 Zoning Code 5-83
5.6.4 Special Management Area 5-83

5.6.5 Shoreline Setback 5-84
5.7 Anticipated Permits and Approvals 5-84
6 STAKEHOLDER ENGAGEMENT AND CONSULTATION 6-1
6.1 Community Meetings 6-1
6.2 Meetings with Elected Officials, Regulatory Agencies, and Landowners 6-2
6.3 Consultation for Cultural Impact Assessment and Historic Preservation Review Process 6-3
6.4 HRS Chapter 343 Scoping and Public Review Process 6-4
6.4.1 Pre-Assessment Scoping 6-11
6.4.2 Public Review of Draft EA 6-14
6.5 Ongoing Stakeholder Engagement 6-14
7 SUMMARY OF FINDINGS AND ANTICIPATED DETERMINATION 7-1
7.1 Significance Criteria 7-1
7.2 Anticipated Determination 7-6
8 REFERENCES 8-1

List of Tables

Table 2-1. Summary of Subsea Cable Segments 2-1
Table 2-2. Summary of Cable Landing Sites 2-2
Table 2-3. Summary of Design Refinements 2-4
Table 2-4. Summary of HDD Conduit Dimensions 2-6
Table 2-5. Summary of BMH Dimensions 2-8
Table 2-6. Summary of Terrestrial Cable 2-8
Table 2-7. Summary of Cable Landing Stations 2-9
Table 2-8. Kauaʻi Cable Landing Site: Tax Map Keys and Land Ownership 2-11
Table 2-9. Oʻahu Cable Landing Site: Tax Map Keys and Land Ownership 2-13
Table 2-10. Maui Cable Landing Site: Tax Map Keys and Land Ownership 2-14
Table 2-11. Molokai Cable Landing Site: Tax Map Keys and Land Ownership 2-15
Table 2-12. Lānaʻi Cable Landing Site: Tax Map Keys and Land Ownership 2-16
Table 2-13. Hawaiʻi Island Cable Landing Site: Tax Map Keys and Land Ownership 2-17
Table 2-14. General Type and Approximate Quantities of Construction Equipment 2-21
Table 3-1. Summary of Flood Zones 3-12

Table 3-2. Summary of Tsunami Hazard Risk and Evacuation Zone Ratings 3-13
Table 3-3. Summary of Seismic Hazard Risk 3-14
Table 3-4. HDOH Water Quality Monitoring Results 3-25
Table 3-5. ESA and State Listed Marine Species With Potential to Occur in Project Area 3-33
Table 3-6. EFH and HAPC Designations for Hawai'i Archipelago MUS 3-39
Table 3-7. Conservative Estimate of Potential Coral and Seagrass Impacts 3-46
Table 3-8. Native Plant Species Recorded within the Project Area 3-57
Table 3-9. Native Bird Species Recorded within the Cable Landing Sites and Immediate Vicinity 3-62
Table 3-10. Federally or State Listed Terrestrial Species with Potential to Occur in Project Area 3-66
Table 3-11. Previously Identified and Potential Historic Properties Within Project Area 3-83
Table 3-12. State of Hawai'i Maximum Permissible Sound Levels by Zoning District 3-106
Table 3-13. Applicable Noise Standards 3-106
Table 3-14. Summary of Anticipated Construction-Related Noise 3-109
Table 3-15. Submarine Cable Crossing Summary 3-111
Table 3-16. Harbor Facilities Within or Near Project Area 3-116
Table 3-17. Summary of Population by County 3-136
Table 3-18. Population Projections by County (2020 to 2050) 3-137
Table 3-19. Share of Households with a Computer and Broadband Internet Subscription 3-138
Table 3-20. Economic Conditions 3-138
Table 5-1. State Land Use Designations 5-17
Table 5-2. Anticipated Federal, State, and County Permits and Approvals 5-85
Table 6-1. Summary of Community Meetings 6-1
Table 6-2. Meetings with Agencies, Landowners, and Other Stakeholders 6-2
Table 6-3. Organizations and Individuals Contacted for Draft EA Scoping and Public Review Process 6-4
Table 6-4. Summary of Comments Received in Response to Pre-Assessment Scoping Letter 6-12

List of Figures

Figure 1 Project Overview
Figure 2 Project Overview: Subsea Cable Segments
Figure 3 Cable Landing Site Layouts
Figure 4 Sea Level Rise Exposure Areas
Figure 5 Regional Geology
Figure 6 NRCS Soils
Figure 7 Flood Zones and Tsunami Evacuation Zones
Figure 8 Onshore Surface Water Features
Figure 9 Benthic Habitat
Figure 10 Designated Critical Habitat for Marine Species
Figure 11 Proposed Critical Habitat for Marine Species
Figure 12 Critical Habitat by Cable Landing Site
Figure 13 Hawaiian Islands Humpback Whale National Marine Sanctuary
Figure 14 Historic Properties
Figure 15 State Land Use
Figure 16 County Zoning and Special Management Area

List of Appendices

Appendix A Letter from Governor Green Regarding HRS Chapter 343 Compliance
Appendix B Equipment Specification Sheets
Appendix C HDD Profiles
Appendix D Inadvertent Drilling Fluid Release Contingency Plan
Appendix E Decommissioning Plan
Appendix F Marine Biota Survey Reports
Appendix G Biological Resources Survey Reports
Appendix H Archaeological Literature Review and Field Inspection Report
Appendix I Cultural Impact Assessment and Ka Pa‘akai Analysis
Appendix J Pre-Assessment Scoping Letter
Appendix K Scoping Comments and Responses

Acronyms and Abbreviations

AADT	average annual daily traffic
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AIS	Automatic Identification System
AIS	archaeological inventory survey
ANSI	American National Standards Institute
APE	area of potential effect
ASCE	American Society for Civil Engineers
ATON	Aids to Navigation
BLNR	Board of Land and Natural Resources
BMH	beach manhole
BMP	best management practice
CEDS	Comprehensive Economic Development Strategy
CIA	Cultural Impact Assessment
CLS	cable landing station
CMECS	Coastal and Marine Ecological Classification Standard
CO	carbon monoxide
CPF	U.S. Treasury Capital Projects Fund
CWRM	State of Hawai‘i Commission on Water Resource Management
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
CZO	Comprehensive Zoning Ordinance
DA	double armor
DAR	Division of Aquatic Resources
DBEDT	Department of Business, Economic Development and Tourism
DEM	Department of Environmental Management
DHHL	Department of Hawaiian Home Lands
DLNR	Department of Land and Natural Resources
DOBOR	Division of Boating and Ocean Recreation
DoD	Department of Defense
DOI	U.S. Department of the Interior

DPP	City and County of Honolulu Department of Planning and Permitting
DPR	City and County of Honolulu Department of Parks and Recreation
DPW	Department of Public Works
EA	environmental assessment
EEZ	exclusive economic zone
EFH	essential fish habitat
EISPN	Environmental Impact Statement Preparation Notice
EPA	Environmental Protection Agency
ERP	Environmental Review Program
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHAT	Flood Hazard Assessment Tool
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
HAAQS	Hawai‘i ambient air quality standards
HAPC	Habitat Areas of Particular Concern
HAR	Hawai‘i Administrative Rules
HC&S	Hawaiian Commercial & Sugar Company
HCC	Hawai‘i County Code
HDD	horizontal directional drilling
HDOH	State of Hawai‘i Department of Health
HDOT	State of Hawai‘i Department of Transportation
HDPE	high-density polyethylene
HiEMA	Hawai‘i Emergency Management Agency
HIFL	Hawaiian Islands Fiber Link
HRS	Hawai‘i Revised Statutes
HVAC	heating, ventilation, and air conditioning
ICPC	International Cable Protection Committee
IDFR	Inadvertent Drilling Fluid Release
IP	Internet Protocol
IPCC	Intergovernmental Panel on Climate Change
KCC	Kaua‘i Community College

KIUC	Kaua‘i Island Utility Cooperative
LWP	lightweight protected
MBES	multibeam echosounder
MBTA	Migratory Bird Treaty Act
MCC	Maui County Code
MHI	main Hawaiian Islands
MLCD	Marine Life Conservation District
MMPA	Marine Mammal Protection Act
mph	miles per hour
ms	millisecond
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NH_4	ammonia nitrogen
NHD	National Hydrography Dataset
NHO	Native Hawaiian Organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
$NO_3 + NO_2$	nitrate + nitrite nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWHI	Northwestern Hawaiian Islands
NWI	National Wetlands Inventory
NWP	nationwide permit
OCCL	Office of Conservation and Coastal Lands
OHA	Office of Hawaiian Affairs
ONI	Ocean Networks Inc.
OPSD	Office of Planning and Sustainable Development
OSCT	O‘ahu Subsea Cable Telecommunications

PACRC	Pacific Aquaculture & Coastal Resource Center
Pac-SLOPES	Procedures for Endangered Species in the Central and Western Pacific Region
PCN	pre-construction notification
PM_{10}	particulate matter less than or equal to 10 micrometers in diameter
$PM_{2.5}$	respirable particulate matter less than or equal to 2.5 micrometers in diameter
ROE	right-of-entry
ROH	Revised Ordinances of Honolulu
ROW	rights-of-way
SA	single armor
SDC	seismic design category
SHPD	State Historic Preservation Division
SHPO	State Historic Preservation Officer
SIHP	State Inventory of Historic Places
SLR-XA	sea level rise exposure area
SMA	Special Management Area
SO_2	sulfur dioxide
SSURGO	Soil Survey Geographic Database
TDS	total dissolved solids
TMDL	Total Maximum Daily Load
TMK	tax map key
TN	total nitrogen
TSS	total suspended solids
UH	University of Hawai‘i
UIC	Underground Injection Control
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VPIT	Vice President for Information Technology
WQC	Water Quality Certification
WWII	World War II

1 INTRODUCTION

The State of Hawai‘i, represented by the University of Hawai‘i (UH), is proposing the Hawaiian Islands Fiber Link (HIFL) Project (Project), an interisland subsea fiber optic cable system that would provide critical infrastructure needed to improve and expand high-speed internet (broadband) access and availability across the state.

The proposed fiber optic cable system would interconnect and distribute broadband to the six main Hawaiian Islands, with cable landing sites strategically located on Kaua‘i, O‘ahu, Maui, Molokai, Lāna‘i, and Hawai‘i Island (see Figure 1). Leveraging federal investment in technological infrastructure, the prospective interisland cable system would address a key component of the state's *Connect Kākou* broadband initiative to ensure that communities across the state have reliable and affordable access to high-speed internet. HIFL would be an open-access and carrier-neutral system[1] that would be sufficiently robust to support all manners of telecommunications carrier and enterprise traffic, including high-capacity demand forecasted for healthcare, education, research, public service, commerce, government, and personal uses.

UH has engaged Ocean Networks Inc. (ONI) to address the construction, operations, and maintenance aspects of the Project, including the environmental review and permitting requirements. It is anticipated that the State of Hawai‘i and ONI will form a public-private partnership, with the HIFL system owned and operated by the resulting entity (HIFL LLC). In addition to providing technical and implementation expertise, ONI would contribute private investment funds to the partnership, supplementing federal funds provided by the state. Through the public-private partnership, the State of Hawai‘i would retain a 20 percent ownership interest in the system; dedicated interisland fiber capacity would also be allocated to the state to support its operations.

1.1 Background

Over the last several decades, broadband has emerged as critical infrastructure for functions including business and economic development, educational advancement, health care, social and civic engagement, governmental and public services, and national security. Fiber optic cable systems, which utilize lasers to transmit data signals through protected fiber optic strands, provide substantially more bandwidth than other technologies and are currently the most robust and feasible method for high-speed transmission and distribution of data. An estimated 95 percent of the world's Internet Protocol (IP) communications are transmitted over subsea fiber optic cable systems. Around the world, diverse networks of subsea fiber optic cable systems traverse the seabed, providing the necessary infrastructure to meet the data communication needs of various nations, islands, and landmasses. Cloud technology[2] and the syncing of information between regional data centers around the world are only made possible through this subsea cable network.

[1] Carrier-neutral systems operate independently of and do not have a specific affiliation with any single carrier or telecommunications company, thus providing increased flexibility and diversity.

[2] Cloud technology refers to the on-demand availability of data storage and delivery of resources and services over the internet.

As with other locations worldwide, the vast majority of broadband connectivity within the State of Hawai‘i is provided via subsea fiber optic cable systems. Due to the state’s island geography, several different types of infrastructure are needed to enable broadband connectivity:

- First mile infrastructure (i.e. trans-Pacific subsea cables connecting Hawai‘i to the global internet);
- Middle mile infrastructure: (i.e. interisland subsea cables linking the various islands within the state to provide high-volume connections on each island); and
- Last mile infrastructure (i.e. terrestrial cables extending from middle mile infrastructure to residences, businesses, and other end-users on each island).

Given the need for subsea cables to deliver broadband to and between islands, this infrastructure is much more expensive, with longer planning and construction timelines, as compared to terrestrial fiber systems used for intrastate infrastructure elsewhere in the country. Because of these constraints, there is only a limited amount of high-speed broadband infrastructure currently serving the various islands within the state. This existing infrastructure, which was designed and installed at a time when digital technology was in its infancy, is aging and does not meet current or projected future demand, especially given the increasing reliance on cloud technology. Furthermore, there are many communities in Hawai‘i that do not have reliable access to the broadband network, with some communities having no access at all.

There has long been recognition of the need to address broadband capacity and access issues in Hawai‘i. In 2007, the Hawai‘i State Legislature created the Hawai‘i Broadband Task Force to remove barriers to access, identify opportunities for increased development and adoption, and enable the creation and deployment of new advanced communication technologies. The Hawai‘i Broadband Task Force Final Report, issued in December 2008, provided specific recommendations including the development of a forward-looking vision to provide widely accessible broadband to all households in Hawai‘i (Hawai‘i Broadband Task Force 2008). The Hawai‘i Broadband Initiative was subsequently developed with a focus on establishing strategic infrastructure and programs in support of trans-Pacific fiber optic cable landings in Hawai‘i as well as a robust broadband network throughout the state to ensure digital equity for all residents. Through this initiative, the Hawai‘i Broadband Strategic Plan was developed to provide information and a framework for policies and programs to meet the state’s goals (DBEDT 2020). The first strategic goal described in the plan focuses on robust broadband infrastructure to serve all Hawai‘i residents, with the plan specifically identifying the required components including trans-Pacific (first mile), interisland (middle mile), and intra-island (last mile) infrastructure.

Building on these efforts, in 2023, the State of Hawai‘i launched *Connect Kākou*, a statewide plan for infrastructural investments to ensure that all of Hawai‘i’s residents have access to robust and reliable broadband service. The strategic framework guiding this effort identifies four investment pillars: (1) governance and sustainability, (2) middle mile infrastructure, (3) last mile infrastructure, and (4) access, equity, and literacy (UH 2024a). The *Connect Kākou* initiative seeks to leverage federal funding granted for middle mile and last mile infrastructure in Hawai‘i (UH 2024b).

1.2 Project Purpose and Need

Previous and ongoing efforts by the State of Hawai‘i, as summarized above, clearly articulate the importance of robust and reliable broadband to ensure high-speed internet access for residents throughout the state. As detailed in the State Broadband Strategic Plan, the State of Hawai‘i recognizes broadband as foundational to Hawai‘i’s economic future and, as importantly, the quality of life of its residents (DBEDT 2020). Furthermore, the importance of this infrastructure is emphasized as an objective and priority guideline in the Hawai‘i State Plan (HRS Chapter 226-10.5) as well as the general plans for the individual counties across the state. In particular, community planning documents for the neighbor islands specifically call for a robust, resilient, and reliable telecommunications network to meet the business, educational, healthcare, and social needs of the islands’ residents (County of Kaua‘i 2018; County of Maui 2012; County of Maui 2016; County of Maui 2018; County of Hawai‘i 2024). The critical need for access to high-speed internet to accommodate remote work, online education, telehealth, entertainment, and other aspects of daily life was recently highlighted by the COVID-19 pandemic.

As described in the *Connect Kākou* initiative, there has been a lack of investment in Hawai‘i’s middle mile infrastructure, resulting in limited and aging assets which provide the critical link between the global internet and Hawai‘i’s residents. In particular, two of Hawai‘i’s three existing interisland fiber optic cable systems have exceeded their expected 25-year lifespan; the third system is aging while also facing legal challenges and inadequate maintenance. In addition to approaching retirement age, these systems also no longer meet the current and projected future bandwidth demands associated with digital streaming and cloud technology. Furthermore, the existing interisland fiber optic cable systems rely on common cable landing sites, terminating in the same or adjacent beach manholes, and lack readily accessible carrier-neutral cable landing stations. Investment in Hawai‘i’s middle mile infrastructure, including diverse and strategically placed carrier-neutral cable landing stations, is needed to ensure that future broadband services are built and delivered on robust, resilient, and reliable middle mile assets (DBEDT 2024a). Naturally, replacement cable systems must be planned years in advance and installed prior to existing cables reaching their end of life, underscoring the need for near-term action to address Hawai‘i’s interisland broadband infrastructure. Recognizing this need, approximately $400 million in federal funding has been sought, some of which has been secured and dedicated to the HIFL Project.

Working within this framework, the purpose of the HIFL Project is to develop an interisland fiber optic cable system with diverse and strategically located cable landing sites to provide the middle mile infrastructure needed for robust and reliable broadband across the State of Hawai‘i. The Project would leverage federal funding allocated to the State of Hawai‘i for middle mile infrastructure and would complement efforts by other parties that are working to provide first and last mile infrastructure to ensure that all of Hawai‘i’s residents have access to high-speed broadband.[3]

[3] Information regarding other efforts being undertaken as part of the state’s broadband initiative, including proposed first and last mile infrastructure projects, are available on the *Connect Kākou* website (https://www.connectkakou.org/).

1.3 Requirements for Environmental Review

Review and disclosure of potential environmental impacts, pursuant to the requirements of Hawai‘i Revised Statutes (HRS) Chapter 343, is required for any agency action that includes one or more triggers identified in HRS Chapter 343-5(a); these requirements are further detailed in Hawai‘i Administrative Rules (HAR) Section 11-200.1, which are the implementing rules for compliance with HRS Chapter 343. As detailed herein, the Project will entail multiple triggers identified in HRS Chapter 343-5(a), including the use of state lands and funds,[4] the use of land classified as a conservation district, and the use of a shoreline area. In accordance with HAR Section 11-200.1-7, the governor or the governor's authorized representative has final authority for the environmental review process of any agency action involving the use of state lands or funds. As detailed in a letter dated October 8, 2024, Governor Josh Green designated UH as the governor's authorized representative for the environmental review process for the Project (see Appendix A). Based on a preliminary assessment of the potential impacts associated with the Project and consistent with HAR Section 11-200.1-14, UH subsequently determined an environmental assessment (EA) to be the appropriate level of environmental review.

The Project will also require compliance with HRS Chapter 205A and applicable county regulations for development within the Special Management Area (SMA). While all county SMA regulations require environmental review if required pursuant to HRS Chapter 343, certain counties have a stand-alone requirement. In particular, the City and County of Honolulu requires an environmental disclosure document prepared in accordance with the procedures set forth in HRS Chapter 343 as part of an application for an SMA Major Permit, pursuant to the Revised Ordinances of Honolulu (ROH) Chapter 25-5.3.

As such, this Draft EA has been prepared in compliance with HRS Chapter 343 and HAR Section 11-200.1, as well as ROH Chapter 25.[5] The purpose of this document is to evaluate and disclose the potential environmental effects of the Project for consideration by state and county agencies in their decision-making related to required permits and approvals, as well as to allow for public participation in the environmental review process. The Draft EA has been submitted to the State of Hawai‘i Office of Planning and Sustainable Development (OPSD) Environmental Review Program (ERP) for publication in *The Environmental Notice*. Comments received during the required 30-day public review period will be incorporated into a Final EA, which will also be published in *The Environmental Notice*. Based on the Final EA and application of the significance criteria in HAR Section 11-200.1-13, UH will issue a determination notice of either a "Finding of No Significant Impact" (FONSI) or an "Environmental Impact Statement Preparation Notice" (EISPN). Based on preliminary information, it is currently

[4] State funds used for this project include those sourced from the U.S. Treasury Capital Projects Fund (CPF) program, which is managed by the UH VPIT under a sub-award from the Office of the Governor through the Department of Budget and Finance. The state's approved programs under CPF include allocating funds to the establishment of a new interisland subsea fiber optic cable system to provide new commercial capacity to directly address the critical needs of Hawai‘i for capacity and resilience in its core telecommunications infrastructure (see Appendix A).

[5] The Project is not expected to require environmental review pursuant to the National Environmental Policy Act (NEPA). Based on *Guidance for the Coronavirus Capital Projects Fund* (2021), NEPA does not apply to projects funded by the CPF program. NEPA compliance associated with federal authorization for the Project is expected to be covered by the U.S. Army Corps of Engineers (USACE) Nationwide Permit Program.

anticipated that a FONSI will be issued for the Project. Additional details regarding the public review process are provided in Section 6.

2 DESCRIPTION OF PROPOSED PROJECT

2.1 Project Overview

The Project involves construction, operation, and maintenance of an interisland fiber optic cable system that would interconnect the six main Hawaiian Islands to provide more robust and reliable broadband connectivity throughout the state. The fiber optic cable system would distribute high-speed broadband to each island, with cable landing sites strategically located on Kauaʻi, Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Island.

The Project would include both marine and terrestrial components, with the marine components comprising approximately 416 miles of subsea fiber optic cable surface-laid on the seabed between the islands. The cable would have a maximum diameter ranging between approximately 0.6 - 1.1 inches, which is roughly the size of a typical household garden hose. The cable would be installed in five distinct segments spanning the nearshore state waters and surrounding federal waters. Based on the projected system demand, the three main segments of cable connecting Kauaʻi, Oʻahu, Maui, and Hawaiʻi Island would contain 24 fiber pairs (48 fiber count) and the two branching segments extending to Molokai and Lānaʻi would contain 12 fiber optic pairs (24 fiber count); all fibers would be contained within a single cable and would not affect the overall cable size. The five segments of subsea cable are summarized in Table 2-1 and shown on Figure 2.

Table 2-1. Summary of Subsea Cable Segments

Route Segment	Segment Endpoints	Fiber Count[1/]	Approximate Route Segment Length[2/]
1	Kauaʻi – Oʻahu	24 pairs (48 count)	118 miles
2	Oʻahu – Maui	24 pairs (48 count)	121 miles
2A	Oʻahu-Maui Segment – Molokai	12 pairs (24 count)	8 miles
2B	Oʻahu-Maui Segment – Lānaʻi	12 pairs (24 count)	26 miles
3	Maui – Hawaiʻi Island	24 pairs (48 count)	143 miles

1/ All fibers would be contained within a single cable and would not affect the overall cable size.
2/ Lengths are approximate and may deviate slightly based on the final design.

Horizontal directional drilling (HDD) would be used to install underground conduit between the onshore area for each cable landing site and an associated offshore punchout point in the nearshore waters, thus allowing the subsea cable to make landfall while traversing beneath and avoiding impacts to the shoreline. The terrestrial components at each cable landing site would include a beach manhole (BMH), terrestrial fiber optic cable (terrestrial cable), and a cable landing station (CLS). The BMH would be an underground reinforced concrete vault where the subsea cable would terminate and connect with the terrestrial cable. The terrestrial cable would extend from the BMH toward the CLS via underground conduit. In addition to the terrestrial cable, the Project would also utilize fiber on each island's existing utility system to connect to the CLS.[6]

[6] The segments of fiber on the existing utility system are generally described herein to provide an overview of the entire system but are not analyzed as part of the Project because they comprise existing third-party infrastructure.

Each CLS, consisting of either space within an existing building or a new modular structure, would be located on UH property to the extent practicable. The CLS would house the equipment needed to support subsea cable transmission and monitoring, as well as facilitate interconnection with the local telecommunications network. Additional details regarding each of the various Project components are provided in Section 2.3. The six cable landing sites are summarized in Table 2-2 and are further detailed in Section 2.4.

Table 2-2. Summary of Cable Landing Sites

Cable Landing Site	Cable Landfall	Cable Landing Station (CLS)
Kauaʻi	Nukoliʻi Beach Park	UH Kauaʻi Community College (KCC)
Oʻahu	Barbers Point Beach Park	UH West Oʻahu / DR Fortress
Maui	Kahului Harbor	UH Maui College
Molokai	Molokai Yacht Club	UH Maui College, Molokai Education Center
Lānaʻi	Mānele Harbor	UH Maui College, Lānaʻi Education Center
Hawaiʻi Island	Pacific Aquaculture & Coastal Resource Center (PACRC)	UH Hilo

2.2 Siting and Design Refinement Process

2.2.1 Site Selection and Routing

In 2022, as part of the effort to advance the concept of new middle mile broadband infrastructure for the State of Hawaiʻi, UH contracted a desktop study to evaluate the feasibility of an interisland cable system. This desktop study included a comprehensive analysis of a broad array of publicly available datasets, as well as inputs acquired through research and reconnaissance-level site visits, resulting in identification of potential cable segment routes and corresponding landfall locations. The analysis considered a range of issues including (but not limited to) bathymetry and seabed conditions in the offshore and nearshore areas, geological risks, fishing and commercial maritime activities, recreational uses, existing offshore and onshore infrastructure, sensitive environmental and cultural resources, and regulatory requirements. This initial analysis was used to identify and exclude areas with known hazards or constraints, while highlighting locations with strong technical potential for an installable and maintainable cable route that avoids and minimizes potential impacts through the preliminary siting process.

Multiple candidate landfall locations were identified and evaluated on each island, based on a variety of criteria including: (1) proximity to terrestrial interconnection points; (2) access by both land and sea for equipment and personnel; (3) viable nearshore routing, with or without HDD; (4) avoidance of conflicts with marine infrastructure, recreational uses, and high-risk features such as high-intensity shipping or offshore disposal zones; and (5) proximity to deep water. Locations near deeper water and lacking nearshore reefs or ledges were prioritized, along with potential nearshore routes aligned through natural protective features such as sheltered embayments and sand channels. These characteristics help to reduce exposure to shallow-water risks (such as wave action and anthropogenic disturbance) as well as minimize impacts to sensitive resources (such as coral and hardground). Site visits were subsequently conducted to confirm site suitability, followed by a

structured risk assessment to further support selection of the preferred cable landfall locations and nearshore routes.

Offshore cable routing was also addressed through the desktop analysis with a focus on minimizing overall cable length while avoiding steep seabed slopes, rugged bathymetry, sensitive or protected areas, anthropogenic hazards (such as dumping grounds and shipwrecks), and geohazards (such as submarine landslides and turbidity channels). Routes were aligned to traverse stable, soft, unconsolidated seabed, avoid environmentally sensitive areas and existing infrastructure, and reduce exposure to high-current and high wave-action zones or areas of intense vessel anchoring or fishing activity, to the extent practicable. In addition to minimizing potential impacts to sensitive resources, this routing approach also improves technical feasibility and long-term cable protection.

The desktop study concluded with identification of recommended cable segment routes and cable landing sites that collectively achieve the designated criteria for the overall system. These results were used to inform the ensuing planning and design process, providing the basis for site-specific due diligence surveys and subsequent design refinements, as further discussed below.

2.2.2 Design Refinement

Building on the results of the desktop study, the Project was subsequently refined through an iterative process informed by an array of due diligence studies, technical analyses, and ongoing stakeholder input. Due diligence studies were conducted to characterize the existing site conditions, further assess siting and route feasibility, and support evaluation of potential Project-related impacts along the proposed cable route and cable landing sites. The study areas for these investigations were broadly defined to accommodate design modifications and refinements as needed to further avoid and minimize potential impacts. Studies conducted to date include geophysical multi-beam echosounder (MBES) marine surveys, benthic habitat dive surveys, geotechnical investigations, terrestrial biological surveys, delineation of Waters of the U.S. (including wetlands), archaeological surveys, cultural resource assessments, and boundary and utility surveys. In addition to these studies, various stakeholder engagement efforts have been conducted, including outreach to resource agencies, community members, and other knowledgeable groups and individuals (for more detail, see Section 6). Input and feedback gathered through stakeholder engagement was used to further inform design refinements.

These efforts to date have resulted in various adjustments and refinements (reflected in the Project description and maps contained herein), with a focus on both optimizing the Project configuration and layout as well as minimizing impacts to the surrounding environment. Substantive design refinements made to date are summarized in Table 2-3. It is anticipated that minor refinements will continue to be made through the final design and engineering process to maximize avoidance of impacts to sensitive resources and further optimize the Project layout.

Table 2-3. Summary of Design Refinements

Cable Landing Site	Substantive Design Refinements
Kaua‘i	Relocated cable landfall to adequately avoid potential ordnance associated with a former military munitions response site in offshore waters
	Adjusted offshore HDD punchout point and associated cable route to avoid corals and other sensitive marine resources based on dive survey results
	Adjusted BMH location to maximize distance from shoreline and setback from applicable sea-level rise and erosion hazard zones
	Minimized extent of trenching for terrestrial conduit through use of third-party underground conduit
O‘ahu	Relocated cable landing site to align and maximize potential synergies with proposed first mile infrastructure project
	Adjusted HDD punchout points and associated cable routes to avoid sensitive marine resources based on dive survey results
	Adjusted BMH locations to maximize setback from applicable sea-level rise and erosion hazard zones
Maui	Incorporated use of existing utility infrastructure to eliminate the need for trenching/drilling for new underground conduit along Kahului Beach Road and Wahinepio Avenue
Molokai	Adjusted cable route to maximize avoidance of corals identified based on dive survey results, while also balancing minimization of impacts to the federal dredged harbor basin
	Adjusted BMH location to maximize distance from shoreline
Lāna‘i	Eliminated the need for CLS at Mānele Harbor by using existing space at UH Maui College Lāna‘i Education Center
	Minimized the extent of ground disturbance associated with terrestrial cable through use of directional drilling
Hawai‘i Island	Modified cable installation approach, using HDD to avoid conflicts with existing wastewater utility infrastructure
	Adjusted offshore HDD punchout point and associated cable route to minimize impacts to marine resources based on dive survey results and community feedback
	Expanded use of existing utility infrastructure to reduce trenching for new underground conduit at UH Hilo campus

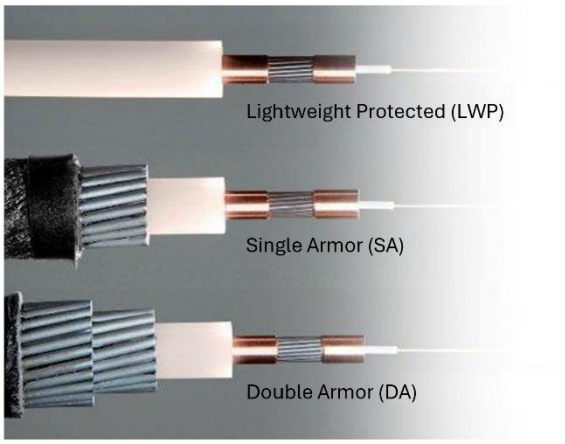
2.3 Project Components

2.3.1 Subsea Cable

As described above, the subsea cable would consist of five distinct segments, totaling approximately 416 miles within nearshore state and federal waters between the six main Hawaiian Islands (see Table 2-1 and Figure 2). The cable would be entirely surface laid on the seafloor; no burial into the seabed would occur as part of the Project beyond the HDD punchout points (see Section 2.3.2).

Three types of fiber optic cable are typically used for subsea systems: unarmored lightweight protected (LWP), single armor (SA), and double armor (DA) cable. All three cable types have a common central element consisting of optical fibers wrapped with ultra-high strength steel wires for protection. Additional layers of material are added to this central element based on the environment in which the cable will be deployed and the deployment methodology. LWP cables include an abrasion resistant steel tape applied to the outer polyethylene surface, along with an outer layer of high-density polyethylene (HDPE) for abrasion resistance and corrosion protection. SA and DA cables include additional galvanized steel armor wires wrapped with nylon yarn to provide further protection against physical damage. Factors influencing selection of the appropriate cable type include potential exposure to external aggression (such as anchoring or fishing activity) as well as the depth and characteristics of the seabed where the cable will be installed. Approximately half the length of subsea cable for the HIFL system would be LWP cable, which would have a maximum diameter of

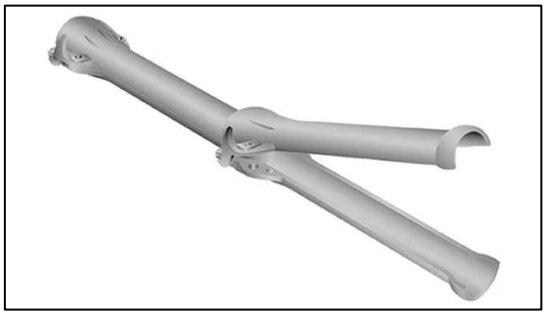
approximately 0.6 inches. The portions of the cable system located in shallow water and/or areas with high potential for external aggression would comprise either SA or DA cable; these would have a maximum diameter of approximately 0.9 and 1.1 inches, respectively. The images below show examples of the different cable types and approximate cable size; specification sheets for the cables to be used for the Project are contained in Appendix B.





Subsea Cable Types (left) and Approximate Size (right)

In certain cases, split pipe can be installed around the cable to provide additional abrasion and impact protection as well as to limit cable movement in high-energy nearshore environments. Split pipe consists of two-piece segments of ductile iron (split lengthwise) which are designed to interlock and articulate around the cable, thereby conforming to the cable path and seabed profile. The interlocking segments are typically joined with flanged ends to maintain continuity and structural integrity along the protected span. Where necessary, the split pipe may be anchored to the seabed (e.g., using epoxy-fixed pins) to further prevent displacement due to high-intensity wave action or currents. Standard split pipe used in subsea cable applications has an external diameter of less than 5 inches along the majority of its length.[7] The image at right shows an illustration of typical split pipe; the segments of the cable route where split pipe is expected to be used are further discussed in Section 3.6.



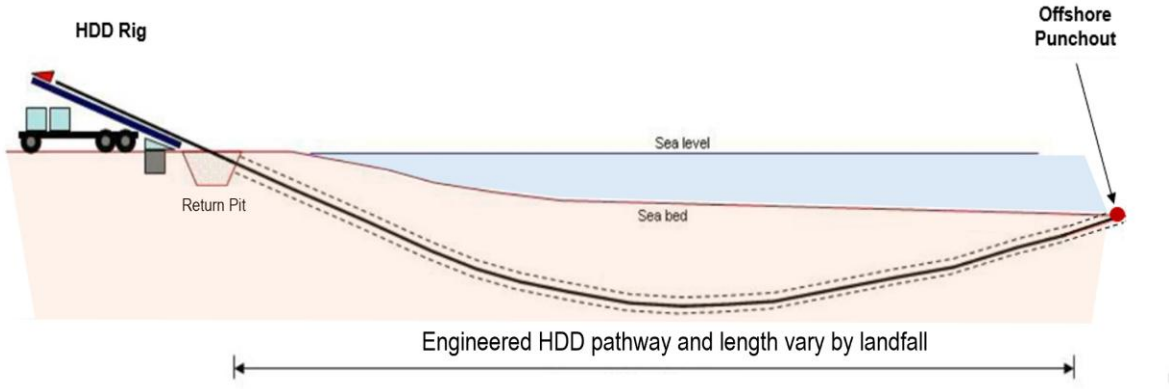
Typical Split Pipe

2.3.2 Cable Landfall

At each cable landing site, HDD would be used to allow the subsea cable to make landfall by traversing under the shoreline and beach (thus avoiding the need for open-cut trenching). HDD, which is considered an industry standard in certain conditions, is a trenchless installation method that utilizes a surface-operated drill rig to install underground conduit along an engineered route to accommodate subsequent cable pulling, as illustrated in the image below. This methodology is

[7] The flanged ends of split pipe, which are used to connect the pipe segments to one another are approximately 7.75 inches in diameter.

routinely used for installation of linear utility infrastructure, particularly as needed to avoid existing facilities and infrastructure (such as roadways, pipelines, and other utilities), accommodate deep burial requirements (e.g., under federal navigation channels), traverse beneath sensitive environmental habitats, and/or provide maximum cable security and protection through high-energy coastal surf zones as the cable transitions from sea to land.



Example of HDD Installation (Typical)

The HDD process utilizes a hydraulic rock cutting drill head attached by a string of drill pipe to a drill rig, which provides forward thrust. Telemetry equipment is housed just behind the drill head which allows the direction and depth of the bore to be tracked and managed by an operator at the surface. Once the boring is completed, the drill head is removed and recovered by divers to a boat, with the drill pipe left in place as conduit. Additional detail regarding the HDD process is provided in Section 2.5.4.

At each cable landing site, the HDD borehole would extend from at or near the BMH to a corresponding offshore punchout point; drawings showing the conceptual HDD profile for each cable landing site are contained in Appendix C. The specific location of each punchout point has been microsited based on the results of nearshore geophysical and benthic dive surveys which were conducted to confirm substrate suitability and facilitate avoidance of sensitive resources to the extent practicable. The location of each HDD punchout point is shown in Figures 3.1 through 3.6; the approximate length of the HDD conduit and water depth at the punchout point for each cable landing site is provided in Table 2-4.

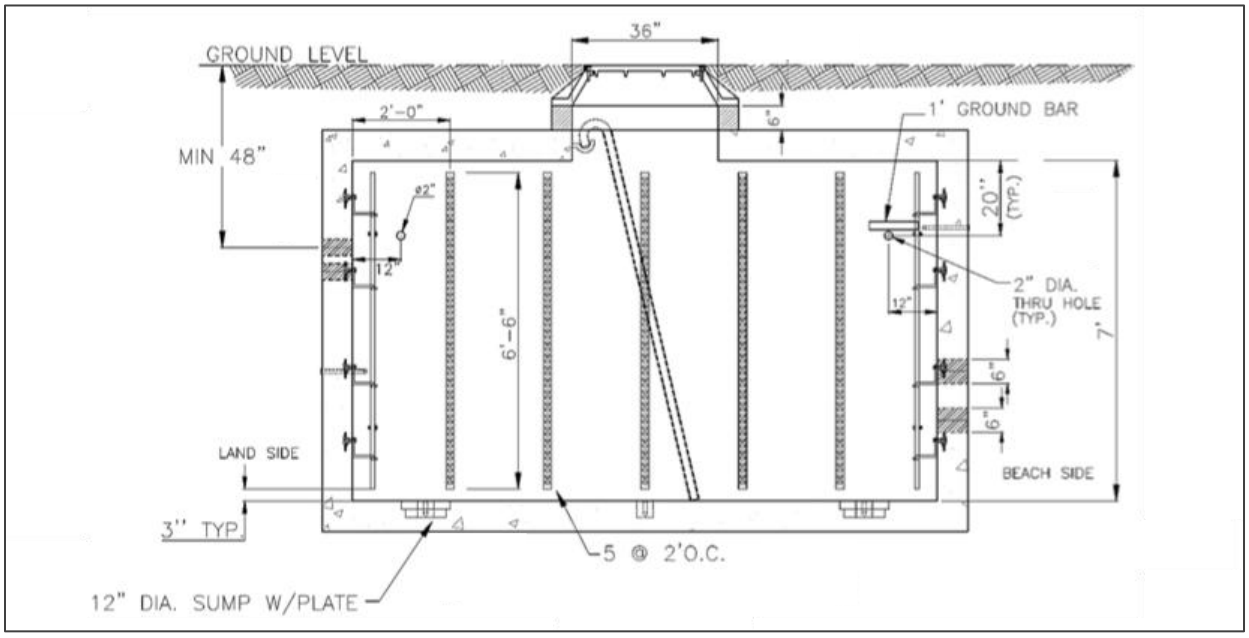
Table 2-4. Summary of HDD Conduit Dimensions[1/]

Cable Landing Site	Cable Landfall	Length of HDD Conduit[2/]	Distance from Shoreline to Punchout	Water Depth at Punchout[3/]
Kaua‘i	Nukoli‘i Beach Park	4,590 feet	4,185 feet	78 feet
O‘ahu	Barbers Point Beach Park	4,400 feet	4,100 feet	60 feet
		5,150 feet	4,850 feet	65 feet
Maui	Kahului Harbor	1,360 feet	1,015 feet	30 feet
		3,375 feet	2,750 feet	42 feet
Molokai	Molokai Yacht Club	905 feet	670 feet	3 feet
Lāna‘i	Mānele Harbor	870 feet	455 feet	24 feet
Hawai‘i Island	PACRC, Hilo	1,185 feet	750 feet	61 feet

1/ All dimensions are approximate and may deviate slightly from the above based on the final Project design.
2/ In some cases, the onshore HDD borehole pit may be slightly offset from the BMH and would be subsequently joined to the BMH via underground conduit; for the purposes of this table, the HDD conduit length represents the horizontal distance between the BMH and punchout point.
3/ Vertical datum is Lowest Astronomical Tide.

2.3.3 Beach Manhole

A BMH would be installed at each cable landfall to facilitate connection of the subsea cable to the terrestrial cable as well as to secure and protect it from environmental and anthropogenic damage. Each BMH would be a pre-cast reinforced concrete vault, installed entirely underground. The vault would include duct entries for both the subsea cable (entering the BMH via the HDD conduit) as well as the terrestrial cable (exiting the BMH towards the CLS via underground conduit). A lockable cast-iron manhole cover, approximately 24-36 inches in diameter, would be located at or just below grade to provide access to the BMH; the manhole cover would be marked and properly secured in accordance with state and local regulations. Once installed, the BMH would be inaccessible to the public, with routine access required only for inspection or maintenance. Meanwhile, the area above the BMH would be returned to its pre-existing use (e.g., grassy area available for recreation). An illustration of a typical BMH is shown below.



Typical Beach Manhole

Each BMH has been sited at a strategic distance from the shoreline to balance competing priorities: minimizing exposure to coastal hazards such as inundation and shoreline erosion, while also managing overall HDD borehole length to enable safe and efficient cable installation offshore. The BMHs are generally placed sufficiently inland to reduce potential coastal flooding, while also remaining close enough to the shoreline to allow for the HDD borehole to extend beyond high-energy wave zones and sensitive nearshore habitats. Importantly, BMH infrastructure is engineered to withstand submerged conditions (with features such as sealed conduits, cable sealing systems, and secure access lids), providing resilience even in areas subject to periodic flooding. The specific location of each BMH is further described in Section 2.4; the approximate distance of the BMH from the shoreline for each cable landfall is provided in Table 2-5.

Table 2-5. Summary of BMH Dimensions

Cable Landing Site	Cable Landfall	Approximate BMH Dimensions[1/]	BMH Distance from Shoreline[1/2/]
Kauaʻi	Nukoliʻi Beach Park	7 feet long; 5 feet wide; 6.5 feet deep	337 feet
Oʻahu	Barbers Point Beach Park	7 feet long; 5 feet wide; 6.5 feet deep	350 feet
		7 feet long; 5 feet wide; 6.5 feet deep	350 feet
Maui	Kahului Harbor	12 feet long; 6 feet wide; 7 feet deep	205 feet
Molokai	Molokai Yacht Club	7 feet long; 5 feet wide; 6.5 feet deep	200 feet
Lānaʻi	Mānele Harbor	7 feet long; 5 feet wide; 6.5 feet deep	139 feet
Hawaiʻi Island	PACRC, Hilo	7 feet long; 5 feet wide; 6.5 feet deep	344 feet

1/ All dimensions are approximate and may deviate slightly from the above based on the final Project design.

2/ BMH distance from shoreline is measured from the BMH to the closest point along the shoreline, based on the surveyed shoreline locations, which have been submitted to the State of Hawaiʻi Department of Land and Natural Resources (DLNR) Land Division for certification pursuant to HAR Section 13-222.

2.3.4 Terrestrial Cable

Terrestrial fiber optic cable would be used to connect the BMH to the CLS at each cable landing site. As previously described, the Project would utilize fiber optic cable that is owned and operated by a licensed utility as part of the existing utility network on each island. In combination with this existing infrastructure, each of the cable landing sites would require a certain amount of terrestrial cable installed in new underground conduit, generally extending from the BMH to reach the existing utility system. This terrestrial cable would be approximately 0.5-0.75 inches in diameter (including a Kevlar or PVC jacket), installed within underground conduit comprising 4-inch HDPE pipe. Buried terrestrial cable would be marked with locating wire and warning tape and may be supplemented by above ground markers installed consistent with state and local regulations for buried underground utilities, generally spaced at intervals of 500 feet. Intermediate manholes and/or handholes would also be installed along the alignment as needed to provide access to buried conduit. The approximate extent of new underground conduit and existing third-party infrastructure to be used for the HIFL system is summarized in Table 2-6; the specific locations are further described in Section 2.4.

Table 2-6. Summary of Terrestrial Cable

Cable Landing Site	Cable Landfall	New Underground Conduit[1/]	Existing Third-Party Infrastructure[2/]
Kauaʻi	Nukoliʻi Beach Park	2,430 feet	5 – 7.5 miles
Oʻahu	Barbers Point Beach Park	845 feet	20 miles
Maui	Kahului Harbor	985 feet	2 - 3 miles
Molokai	Molokai Yacht Club	1,050 feet	0.7 - 0.8 miles
Lānaʻi	Mānele Harbor	705 feet	7 - 10 miles
Hawaiʻi Island	PACRC, Hilo	580 feet	3 - 4 miles

1/ All dimensions are approximate and may deviate slightly from the above based on the final Project design.

2/ The routing and approximate length of existing third-party infrastructure to be used for the Project is based on preliminary information provided by each contracted utility; actual routing and length may vary based on final plans determined by the contracted utility.

2.3.5 Cable Landing Station

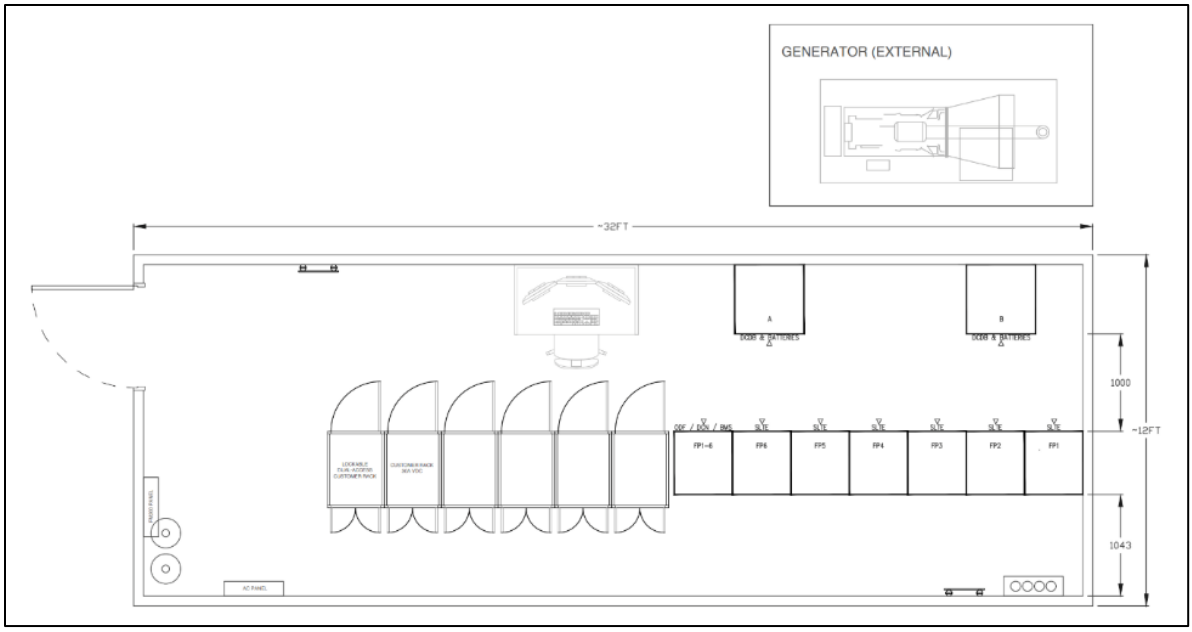
At each cable landing site, the terrestrial cable would connect to a CLS which would contain the equipment needed for cable operations and monitoring as well as to facilitate interconnection with the local telecommunications network. Each CLS has been sited on UH-owned property, either as space in an existing building or as a new stand-alone modular structure, to the extent practicable. A summary of the proposed CLS facilities is provided in Table 2-7.

Table 2-7. Summary of Cable Landing Stations

Cable Landing Site	CLS Location and Type		Approximate Dimensions[1/]
Kauaʻi	Kauaʻi Community College (KCC)	Space within existing building with new emergency generator	N/A
Oʻahu	UH West Oʻahu / DR Fortress	Space within existing building[2/]	N/A
Maui	UH Maui College	New modular structure with emergency generator	768 square feet (24 feet by 32 feet)
Molokai	UH Maui College, Molokai Education Center	New modular structure with emergency generator	96 square feet (8 feet by 12 feet)
Lānaʻi	UH Maui College, Lānaʻi Education Center	Space within existing building[2/]	N/A
Hawaiʻi Island	UH Hilo	New modular structure with emergency generator	768 square feet (24 feet by 32 feet)

1/ Dimensions reflect approximate size of CLS structure; emergency generators would be installed on a concrete pad adjacent to CLS structure. All dimensions are approximate and may deviate slightly from the above based on the final Project design.
2/ The interconnection provided at UH West Oʻahu and Lānaʻi Education Center would be for state use; the necessary equipment would fit within an existing building with no buildout or backup emergency power required. Interconnection for commercial carriers on Oʻahu and Lānaʻi would be at DR Fortress and the utility connection point at Mānele Harbor, respectively.

Each CLS would be an unmanned utility facility, occasionally accessed during normal business hours. It would house submarine line terminating equipment, which handles the subsea cable capacity and interface with other networks, as well as cross connect equipment, climate control equipment (i.e. heating, ventilation, and air conditioning [HVAC]), and power and control systems. The new CLS structures (as well as the Kauaʻi CLS) would also include an external generator, installed on a concrete pad (approximately 4 feet by 9 feet); the generator would only be used as needed to provide back-up power during emergencies (with occasional testing to ensure readiness). The typical layout of a new CLS structure is illustrated in the image below.



Typical Layout of New CLS Structure

2.4 Cable Landing Sites

2.4.1 Kauaʻi

The cable landfall site on Kauaʻi would be located at Nukoliʻi Beach Park, approximately 2.6 miles northeast of Līhuʻe. This site comprises an undeveloped beach park accessed via Kauaʻi Beach Drive and Kauaʻi Beach Road from Kūhiō Highway, just north of Hanamāʻulu. It is located immediately south of the Outrigger Kauaʻi Beach Resort and is otherwise surrounded by agricultural and undeveloped lands. The CLS at Kauaʻi Community College (KCC) is located along Kaumualiʻi Highway in Puhi, approximately 1.5 miles west of Līhuʻe. KCC is bordered by other educational facilities to the west and north (Kawaikini Charter School and Island School, respectively), Kilohana Estate to the east, and a residential neighborhood to the south beyond Kaumulaliʻi Highway.

The cable landfall would include a single HDD conduit, extending approximately 4,590 feet from a BMH to the offshore punchout point at a water depth of approximately 78 feet. The BMH would be sited in an undeveloped portion of the beach park near the existing bathroom facilities, approximately 337 feet from the nearest point along the shoreline. From the BMH, terrestrial cable would be installed in a combination of new and third-party underground conduit along Kauaʻi Beach Road and Kauaʻi Beach Drive, terminating at a manhole near the intersection with Kūhiō Highway. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, generally following a route along Kūhiō Highway and Kaumualiʻi Highway to KCC. Space within an existing building on the KCC campus would be used for the CLS. A new generator would be located adjacent to the existing building to provide emergency power; approximately 20 feet of trenching would be required for underground conduit to run power between the generator and the CLS.

Figure 3.1 shows the approximate location of the Project components associated with the Kauaʻi cable landing site. The affected tax map keys (TMKs) and associated landowners are listed in Table 2-

8Table 2-8. Agreements to use these areas for the Project components will be obtained from the respective parties, including a submerged lands easement from the State of Hawai‘i Department of Land and Natural Resources (DLNR) for installation of the subsea cable and cable landfall within state waters as well as an easement from the private landowners for installation of the terrestrial components.

Table 2-8. Kaua‘i Cable Landing Site: Tax Map Keys and Land Ownership

Project Component	Tax Map Key	Landowner
Offshore Portion of Cable Landfall (HDD Conduit) and Subsea Cable in State Waters[1/]	None	State of Hawai‘i (DLNR)
Onshore Portion of Cable Landfall (HDD Conduit) and BMH	(4) 3-7-003:007	Garden Isle Dream LLC
Terrestrial Cable[2/]	(4) 3-7-003:017	Kaua‘i Beach Resort Assoc; Knickerbocker Life Ins Co; Walter T Shimoda; and Nancy Shimoda
	(4) 3-7-003:999	Kūhiō Highway (State of Hawai‘i Department of Transportation [HDOT] ROW)
CLS	(4) 3-4-007:003	University of Hawai‘i

1/ The State's jurisdiction over the subsea cable extends to the edge of state waters (3 nautical miles).
2/ The terrestrial cable refers to new underground conduit that would be installed for fiber optic cable for the Project. The Project would also utilize third-party conduit as well as fiber owned by a licensed utility as part of the existing utility system; this third-party infrastructure is not further addressed herein.

2.4.2 O‘ahu

The O‘ahu cable landfall site is located at Barbers Point Beach Park, in the Kalaeloa district of O‘ahu. Barbers Point Beach Park is an approximately 7-acre park located along the southwestern shoreline and is managed by the City and County of Honolulu Department of Parks and Recreation (DPR). This site is surrounded by a variety of industrial sites, as well as Germaine's Luau to the west.

As previously described in Section 2.2.2, subsequent to the initial routing study, the cable landfall site on O‘ahu was modified to be located at Barbers Point Beach Park in order to align and maximize potential synergies with proposed first mile infrastructure. Specifically, in mid-2024, plans were announced for a proposed cable system linking Hawai‘i to the continental U.S., other Pacific Islands, Australia, and Japan (O‘ahu Subsea Cable Telecommunications [OSCT] Project); the proposed landfall for this system is located at Barbers Point Beach Park. While the two systems would have independent utility and serve different purposes (i.e. first mile versus middle mile infrastructure), collocating HIFL's cable landfall with the OSCT system could allow for shared use of the cable landing infrastructure, thus providing economies of scale and more efficient use of resources while also minimizing impacts. As such, HIFL's cable landfall has been sited and designed in collaboration with the OSCT Project to ensure compatibility of the HIFL Project with their proposed first mile infrastructure.[8] Through this collaboration and based on the anticipated timeline for implementation of the two projects, the OSCT cable landing infrastructure (e.g., HDD conduits and BMHs) could be built prior to the HIFL Project; in

[8] The OSCT Project is proposing installation of six HDD conduits and BMHs. The two HDD conduits and BMHs described herein for the HIFL Project correspond to two of the six HDD conduits and BMHs proposed by the OSCT Project; the remaining infrastructure proposed by OSCT is not further addressed herein. Additional information regarding the OSCT Project is provided in their Final Environmental Assessment, published on October 8, 2025 (ICF 2025).

this case, HIFL would execute an agreement to use OSCT infrastructure (e.g., two of the six HDD conduits and associated BMHs) for the cable landfall at this site. However, recognizing there is a risk that the OSCT Project may not proceed, this Draft EA assumes the necessary cable landing infrastructure would be constructed as part of the HIFL Project.

At this landfall, the Project would involve two HDD conduits — one extending approximately 4,400 feet from a BMH to the offshore punchout point for the cable connecting to Kauaʻi (Segment 1), and the other extending approximately 5,150 feet from a BMH to the offshore punchout point for the cable connecting to Maui (Segment 2). The punchout points would be at water depths of approximately 60 feet and 65 feet, respectively. The BMHs would be located in an undeveloped portion of the beach park near the existing bathroom facilities, each approximately 350 feet from the nearest point along the shoreline. At the BMHs, the subsea cables would each be spliced to a terrestrial cable, which would be installed in new underground conduit to a manhole located next to an existing utility pole at the end of ʻŌlaʻi Street; conduit would also be installed to provide a connection with the OSCT terrestrial cable for redundancy. From the existing utility pole, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, generally following a route along county and state roadways to the DR Fortress data center in central Honolulu. Space within an existing building at DR Fortress would be used as the CLS for this cable landing. En route, the fiber would also connect to an existing building within the UH West Oʻahu campus to provide a utility connection point for the state. No ground disturbance or new construction would be required for either the CLS or utility connection point.

Figure 3.2 shows the approximate location of the Project components associated with the Oʻahu cable landing site. The affected TMKs and associated landowners are listed in Table 2-9. Agreements to use these areas for the Project components will be obtained from the respective parties, including a submerged lands easement from DLNR for installation of the subsea cable and cable landfall within state waters as well as an easement from the City and County of Honolulu for installation of the terrestrial components.[9]

[9] The extent of the requested easements with DLNR and City and County of Honolulu would be determined in coordination with the OSCT Project to ensure proper coverage of the various Project components. In the event the OSCT Project is built prior to HIFL, it is anticipated that the easement for the cable landfall infrastructure (i.e., HDD conduits and BMHs) would be obtained by the OSCT Project and the easement for the subsea cable would be obtained by the HIFL Project. In the event the OSCT Project is not built, the HIFL Project would obtain easements for all necessary infrastructure.

Table 2-9. O‘ahu Cable Landing Site: Tax Map Keys and Land Ownership

Project Component	Tax Map Key	Landowner
Offshore Portion of Cable Landfall (HDD Conduit) and Subsea Cable in State Waters[1/]	None	State of Hawai‘i (DLNR)
Onshore Portion of Cable Landfall (HDD Conduit) and BMH	(1) 9-1-026:027	City and County of Honolulu
Terrestrial Cable[2/]	None	‘Ōla‘i Street (City and County of Honolulu ROW)
CLS	(1) 9-1-016:220	University of Hawai‘i
	(1) 1-1-015:013	Loyalty Development Co Ltd (leased to DR Fortress LLC)

1/ The State’s jurisdiction over the subsea cable extends to the edge of state waters (3 nautical miles).
2/ The terrestrial cable refers to new underground conduit that would be installed for fiber optic cable for the Project. The Project would also utilize fiber that is owned and operated by a licensed utility as part of the existing utility system; this existing third-party infrastructure is not further addressed herein.

2.4.3 Maui

The cable landfall site on the island of Maui is located at Kahului Harbor, which is located on the north side of Central Maui. Specifically, the cable landfall would be on the western harbor breakwater area, which is an undeveloped man-made feature that is part of HDOT’s harbor facility and also supports Kahului Ramp, a small boat facility managed by the DLNR Division of Boating and Ocean Recreation (DOBOR). The western harbor breakwater area is bounded to the southwest by Kahului Beach Road, beyond which is the County of Maui’s Keōpūolani Regional Park and Maui Arts & Cultural Center. UH Maui College is adjacent to the southern edge of Keōpūolani Regional Park and Maui Arts & Cultural Center, separated by Wahinepio Avenue.

The Project would require two HDD conduits at this landfall — one extending approximately 1,360 feet from a BMH to the offshore punchout point for the cable extending to O‘ahu (Segment 2), and the other extending approximately 3,375 feet from the same BMH to the offshore punchout point for the cable extending to Hawai‘i Island (Segment 3). The punchout points would be at water depths of approximately 30 feet and 42 feet, respectively. The BMH would be located within an undeveloped portion of the western harbor breakwater area, approximately 205 feet from the nearest point along the shoreline. At the BMH, the subsea cables would each be spliced to a terrestrial cable, which would be installed in underground conduit extending across the western breakwater area and under Kahului Beach Road, to a manhole sited next to an existing utility pole adjacent to the roadway. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, including the overhead system along state and county roadways as well as underground conduit extending into the UH Maui College campus. The CLS for this site would be a new modular structure (with an adjacent emergency generator) in the area currently used for the recycling center on the northwestern edge of the UH Maui College campus. Underground conduit would be installed between the CLS and an adjacent building on the UH Maui College campus to connect the Project with the existing telecommunication and utility network.

Figure 3.3 shows the approximate location of the Project components associated with the Maui cable landing site. The affected TMKs and associated landowners are listed in Table 2-10. Agreements to use these areas for the Project components will be obtained from the respective parties, including a

submerged lands easement from DLNR for installation of the subsea cable and cable landfall within state waters as well as an easement from HDOT for installation of other Project components.

Table 2-10. Maui Cable Landing Site: Tax Map Keys and Land Ownership

Project Component	Tax Map Key[1/]	Landowner
Offshore Portion of Cable Landfall (HDD Conduit) and Subsea Cable in State Waters[2/]	None	State of Hawai'i (DLNR)
	(2) 3-7-001:022[3/]	State of Hawai'i (Department of Transportation [HDOT] via Executive Order)
Onshore Portion of Cable Landfall (HDD Conduit) and BMH	(2) 3-7-001:021	State of Hawai'i (HDOT via Executive Order)
Terrestrial Cable[4/]		
	(2) 3-7-001:999	Kahului Beach Road (HDOT ROW)
CLS	(2) 3-8-007:040	University of Hawai'i

1/ TMK (2) 3-8-007:001, which is owned by the County of Maui (leased to Maui Nui Botanical Gardens, Inc.) is also within the Project Area. No Project components would be installed within this parcel; however, temporary construction access may be required.
2/ The State's jurisdiction over the subsea cable extends to the edge of state waters (3 nautical miles).
3/ This parcel is associated with Kahului Harbor; the subsea cable would cross under this TMK in the harbor channel.
4/ The terrestrial cable refers to new underground conduit that would be installed for fiber optic cable for the Project. The Project would also utilize fiber that is owned and operated by a licensed utility as part of the existing utility system; this existing third-party infrastructure is not further addressed herein.

2.4.4 Molokai

The cable landfall site on Molokai is located just northwest of Kaunakakai Harbor on the island's south side. It is located within a parcel owned by the County of Maui and used by the Molokai Yacht Club. The site is bordered on the west by undeveloped privately-owned land and to the east by a county-owned parcel used by Aha Kukui o Molokai as well as Department of Hawaiian Home Lands (DHHL) property comprising the Malama Cultural Park. These properties are bounded to the north by an industrial area, beyond which is Mauna Loa Highway. Molokai Education Center, which serves as the hub for all UH programs on Molokai, is located approximately 0.75 miles east along Kamehameha V Highway. It is surrounded by undeveloped land to the north and east (beyond Alanui Kaimike Street), Duke Maliu Regional Park to the west, and Kōheo wetland and residential properties to the south across Kamehameha V Highway.

The landfall would include a single HDD conduit, extending approximately 905 feet from a BMH to the offshore punchout point at a water depth of approximately 3 feet; from the punchout point, the cable would be routed along the western edge of the dredged basin for Kaunakakai Harbor. The BMH would be sited in an undeveloped area adjacent to the yacht club facilities, approximately 200 feet from the nearest point on the shoreline. From the BMH, terrestrial cable would be installed in an underground conduit extending to a manhole sited next to an existing utility pole adjacent to Mauna Loa Highway. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, extending along Mauna Loa / Kamehameha V Highway to an existing utility pole located near the intersection of Kamehameha V Highway and Alanui Kaimike Street. Terrestrial cable would be installed within existing underground conduit extending from the utility pole into the Molokai Education Center to connect the Project with the existing telecommunications and utility network. From the Molokai Education Center, terrestrial cable would be installed in a new underground conduit to the CLS, which would be a new modular structure with an adjacent emergency generator located on the property of the Molokai Education Center.

Figure 3.4 shows the approximate location of the Project components associated with the Molokai cable landing site. The affected TMKs and associated landowners are listed in Table 2-11. Agreements to use these areas for the Project components will be obtained from the respective parties, including a submerged lands easement from DLNR for installation of the subsea cable and cable landfall within state waters as well as an easement from the County of Maui for installation of the terrestrial components.

Table 2-11. Molokai Cable Landing Site: Tax Map Keys and Land Ownership

Project Component	Tax Map Key[1/]	Landowner
Offshore Portion of Cable Landfall (HDD Conduit) and Subsea Cable in State Waters[2/]	None	State of Hawai'i (DLNR)
	(2) 5-3-001:011[3/]	State of Hawai'i
Onshore Portion of Cable Landfall (HDD Conduit) and BMH	(2) 5-3-001:003	County of Maui[4/]
Terrestrial Cable[5/]	(2) 5-3-003:999	Alanui Kaimike Street (County ROW)
CLS	(2) 5-3-003:014	University of Hawai'i

1/ TMK (2) 5-3-003:013, which is owned by UH, is also within the Project Area. The Project has been designed to avoid any work within this parcel.
2/ The State's jurisdiction over the subsea cable extends to the edge of state waters (3 nautical miles).
3/ This parcel is associated with Kaunakakai Harbor, which is shared by DOT and DOBOR; the subsea cable would cross this TMK in the harbor channel.
4/ Although not reflected in the public records, it is understood that the county leases or has a similar agreement for use of this parcel by the Molokai Yacht Club.
5/ The terrestrial cable refers to new underground conduit that would be installed for fiber optic cable for the Project. The Project would also utilize fiber that is owned and operated by a licensed utility as part of the existing utility system; this existing third-party infrastructure is not further addressed herein.

2.4.5 Lāna'i

The cable landfall site on Lāna'i is located at the Mānele Small Boat Harbor on the south side of the island, approximately 9 miles southeast of Lāna'i City. The harbor is generally surrounded by undeveloped land owned by Lāna'i Resorts LLC (managed by Pūlama Lāna'i); Hulupo'e Beach Park is located approximately 0.25 miles to the southwest and the Four Seasons Resort Lāna'i is located approximately 0.4 miles to the west.

The landfall would include a single HDD conduit, extending approximately 870 feet from a BMH to the offshore punchout point at a water depth of approximately 24 feet. The BMH would be sited in the southern-most parking lot for the harbor, approximately 139 feet from the nearest point on the shoreline. From the BMH, the terrestrial cable would be installed in underground conduit to an existing manhole near the harbor entrance road, where the Project would interconnect with the island's existing telecommunication network. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing telecommunication network, generally following a route along existing roadways to the UH Maui College, Lāna'i Education Center in Lāna'i City. Space within an existing building at the Lāna'i Education Center would be used as the CLS, with a utility connection point for the state. No ground disturbance or new construction would occur at Lāna'i Education Center.

Figure 3.5 shows the approximate location of the Project components associated with the Lāna'i cable landing site. The affected TMKs and associated landowners are listed in Table 2-12. Agreements to use

these areas for the Project components will be obtained from the respective parties, including a submerged lands easement from DLNR for installation of the subsea cable and cable landfall within state waters as well as an easement from the State of Hawai'i for installation of the terrestrial components.

Table 2-12. Lāna'i Cable Landing Site: Tax Map Keys and Land Ownership

Project Component	Tax Map Key	Landowner
Offshore Portion of Cable Landfall (HDD Conduit) and Subsea Cable in State Waters[1/]	None	State of Hawai'i (DLNR)
Onshore Portion of Cable Landfall (HDD Conduit) and BMH	(2) 4-9-017:006	State of Hawai'i (DOBOR via Executive Order)
Terrestrial Cable[2/]	(2) 4-9-017:027	State of Hawai'i
CLS	(2) 4-9-006:065	Lāna'i Resorts LLC (Leased by University of Hawai'i)

1/ The State's jurisdiction over the subsea cable extends to the edge of state waters (3 nautical miles).
2/ The terrestrial cable refers to new underground conduit that would be installed for fiber optic cable for the Project. The Project would also utilize fiber that is owned and operated by a licensed utility as part of the existing utility system; this existing third-party infrastructure is not further addressed herein.

2.4.6 Hawai'i Island

The cable landfall site on Hawai'i Island is located at Pacific Aquaculture & Coastal Resource Center (PACRC), just east of the Hilo Harbor breakwater on the east side of the island. PACRC, which is affiliated with UH Hilo, is a research and education facility focused on aquaculture and resource management. Adjacent land uses include a county wastewater pump station to the east (with associated pipelines extending offshore), Keaukaha Beach Park further to the east and extending north along the shoreline past PACRC, the DHHL Keaukaha homestead residential tract to the south (across Kalaniana'ole Avenue), and Hilo Harbor to the west. UH Hilo is located approximately 3 miles southwest of PACRC; it is surrounded by a variety of residential neighborhoods, government facilities, and other civic structures.

The landfall would include a single HDD conduit, extending approximately 1,185 feet from a BMH to the offshore punchout point at a water depth of approximately 61 feet. Given the presence of wastewater utility infrastructure in the immediate vicinity of the cable landfall, the HDD conduit has been specifically sited to facilitate crossing and avoid impacts to the buried wastewater pipes. The BMH would be located in an undeveloped portion of the PACRC site, approximately 344 feet from the nearest point on the shoreline. From the BMH, the terrestrial cable would be installed in underground conduit to a manhole installed adjacent to a nearby utility pole. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, including the overhead system along state and county roadways as well as underground conduit extending into the UH Hilo campus. The CLS for this site would be a new modular structure with an adjacent emergency generator constructed on the northern side of the UH Hilo campus near Lanikāula Street. Underground conduit would be installed between the CLS and an adjacent building on the UH Hilo campus to connect the Project with the existing telecommunication and utility network.

Figure 3.6 shows the approximate location of the Project components associated with the Hawai'i Island cable landing site. The affected TMKs and associated landowners are listed in Table 2-13.

Agreements to use these areas for the Project components will be obtained from the respective parties, including a submerged lands easement from DLNR for installation of the subsea cable and cable landfall within state waters as well as an easement from DHHL and the State of Hawai‘i for installation of the terrestrial components.

Table 2-13. Hawai‘i Island Cable Landing Site: Tax Map Keys and Land Ownership

Project Component	Tax Map Key[1/]	Landowner
Offshore Portion of Cable Landfall (HDD Conduit) and Subsea Cable in State Waters[2/]	None	State of Hawai‘i (DLNR)
Onshore Portion of Cable Landfall (HDD Conduit) and BMH	(3) 2-1-011:005	Department of Hawaiian Home Lands (DHHL)
	(3) 2-1-011:010	State of Hawai‘i (County of Hawai‘i via Executive Order)
	(3) 2-1-011:004	State of Hawai‘i (University of Hawai‘i via Executive Order)
Terrestrial Cable[3/]	(3) 2-1-009:001	State of Hawai‘i (University of Hawai‘i via Executive Order)
CLS	(3) 2-4-001:167	State of Hawai‘i (University of Hawai‘i via Executive Order)

1/ TMK (3) 2-1-009:041, which is owned by the State of Hawai‘i (University of Hawai‘i via Executive Order) is also within the Project Area. No Project components would be installed within this parcel; however, temporary construction access would be required.
2/ The State’s jurisdiction over the subsea cable extends to the edge of state waters (3 nautical miles [nm]).
3/ The terrestrial cable refers to new underground conduit that would be installed for fiber optic cable for the Project. The Project would also utilize fiber that is owned and operated by a licensed utility as part of the existing utility system; this existing third-party infrastructure is not further addressed herein.

2.5 Project Construction

Project-related construction activities would include safety and environmental compliance, site preparation, transport and delivery of Project equipment and materials, and equipment installation. Each of these activities is generally described below.

2.5.1 Site Safety and Environmental Compliance

Prior to the start of construction, Project-specific plans addressing construction safety and environmental compliance would be prepared and finalized. The specific plans needed for construction would be based on industry best practices, requirements specified in applicable permit conditions of approval, and relevant federal, state, and local regulations; these are expected to include, but are not necessarily limited to: (1) site-specific safety plans, (2) Storm Water Pollution Prevention Plan (SWPPP), (3) erosion control plans, (4) traffic management plans, and (5) an Inadvertent Drilling Fluid Release (IDFR) Contingency Plan. The applicable plans would be coordinated with the relevant agencies and implemented throughout Project construction (including construction worker training as needed).

2.5.2 Site Preparation

Site preparation would involve establishment of temporary construction work areas, including staging and access, for construction of the onshore components and cable landing activities. This could include minor vegetation removal, site grading/leveling, limited compaction, and/or laying of crushed rock or temporary construction pads to support construction vehicles. Temporary construction work areas would vary from site to site, but in general, would comprise less than 1.25

acres for each cable landing site. Temporary construction work areas would be surrounded by security fencing (up to 8 feet high) for the duration of construction, as appropriate. All staging and construction activities would occur within the limits of the Project Area as indicated in Figures 3.1 through 3.6.

Site preparation would also incorporate best management practices (BMPs) to avoid and minimize potential impacts to the surrounding environment. In particular, BMPs would include various procedures, practices, treatments, structures and/or devices designed to eliminate and minimize the potential discharge of pollutants to the surrounding environment. The BMPs to be implemented would be determined in accordance with applicable federal, state, and local regulatory requirements as well as industry standards. As further discussed throughout Section 3, specific BMPs would address erosion prevention, sediment control, and good housekeeping. No ground disturbing activities would occur until BMPs have been properly implemented.

2.5.3 Onshore Equipment Transport and Delivery

The Project equipment for construction of the onshore components at each cable landing site would be transported to the respective commercial harbor on each island via a freight shipping company and offloaded to standard transportation trucks. The trucks would deliver and offload the equipment to the Project site via existing state and county roadways. It is anticipated that a total of approximately 15-25 truck trips would be required to transport the equipment to the Project site on each island, including 2-3 oversized loads (for the HDD drill rig and modular CLS structure, as applicable). No roadway improvements or other construction are expected to be required to accommodate the equipment transport. As noted in Section 2.5.1, a traffic management plan would be developed for each cable landing site to address both equipment transport/delivery and Project construction activities, as needed, with the implementation of appropriate measures to minimize potential traffic-related impacts.

2.5.4 Horizontal Directional Drilling

At each cable landing site, an HDD drill rig would be staged onshore within the temporary construction work area. Once the HDD drill rig and other necessary construction equipment (as listed below in Table 2-14) have been properly staged, a pit approximately 6 feet wide by 6 feet long and 6 feet deep would be excavated along the cable alignment at or near the BMH location to accommodate the onshore drill rig. The rig would be used to drill an approximately 6-inch diameter borehole in the side of the pit, following a smooth curving trajectory along an engineered route downward below the shoreline then upward to the offshore punchout point on the seafloor. In general, HDD drilling would reach a maximum depth ranging from approximately 35 to 85 feet below the shoreline, depending on the site (see Appendix C). An approximately 6-inch-diameter drill pipe would be advanced through the borehole along with the drill bit using a combination of a hydraulic rock cutting drill head attached by a string of drill pipe to a drill rig, which would provide forward thrust. Telemetry equipment located just behind the drill head would be used to track and manage the direction and depth of the bore from the ground surface. Once the drill bit and attached drill pipe have cleared the punchout point, the drilling head assembly would be removed and recovered by divers to a barge or vessel; the drill pipe would be left in place to serve as the conduit for the subsea cable. The conduit would include a pilot

line to facilitate future cable pulling, and the ends would be sealed until the subsea cable is landed. The seaward end of the conduit would be left buried at a depth of approximately 1-2 feet, to minimize any protrusions onto the seabed. Installation of each HDD borehole is generally expected to take approximately 2 to 6 weeks (plus mobilization and demobilization), depending on the site.

Drilling operations would involve use of a naturally occurring thixotropic[10] mud, such as bentonite (a non-toxic, naturally occurring clay commonly used for agricultural purposes), to facilitate passage of the drill bit through the substratum and carry cuttings back out of the borehole. The specific bentonite-based drilling fluid used for the Project would be selected by the contractor based on specific site conditions. Drilling fluid would generally be used for all HDD operations except for the final approach (i.e. approximately 100-200 feet before the punchout point), in which case freshwater would be used to minimize the potential release of drilling fluid to the marine environment when the drill bit emerges at the punchout point. The drilling fluid would be recycled via a pump located in the drill pit, which would direct the returned, used drilling fluid to an onsite slurry separation system where clean drilling fluid would be separated and reused for drilling. The clean soil by-product would be stockpiled for use or disposed of at an offsite facility authorized to accept construction and demolition debris. Any slurry that cannot be reused would also be disposed of at an authorized offsite location.

Although occurrences are rare, impacts to the surrounding environment can occur during HDD activities as a result of an Inadvertent Drilling Fluid Release (IDFR). An IDFR can be caused by blockage of the return flow around the drill pipe and typically occurs when highly fractured soils or unconsolidated materials are encountered or when the bore path is extremely shallow. The potential for accidental releases of drilling fluid into the environment would be minimized and mitigated through careful planning as well as implementation of specific measures detailed in an IDFR Contingency Plan. These measures would include pre-drilling preparations, monitoring requirements during drilling, and stop work, containment, and recovery procedures in the event of a release. The preliminary IDFR Contingency Plan for the Project is contained in Appendix D.

2.5.5 Onshore Construction

Onshore construction would be conducted in coordination with the HDD to ensure the proper infrastructure is in place prior to laying the subsea cable. Onshore construction would involve preparation of the BMH, installation of underground conduit and placement of terrestrial cable, and construction of the CLS facilities. The general methodology and extent of disturbance associated with construction of these components is summarized below. The general type and approximate quantities of equipment expected to be used for onshore construction are listed below in Table 2-14.

- **Beach Manhole (BMH):** Following site clearing and preparation, excavation for the BMH would commence in coordination with the HDD; where feasible, the BMH excavation would utilize the HDD pit. Excavation would extend several feet in each direction beyond the BMH dimensions for each site (see Table 2-5), depending on the structural design and subsurface conditions. Following excavation, the precast vault would be lowered into place; the secured

[10] Thixotropic refers to a material that becomes fluid when stirred or shaken, and returns to a semi-solid state upon standing.

manhole cover would be installed on the top of the vault, sitting at or just below the ground surface. The excavated area surrounding the BMH would be backfilled using native material compacted to prevent settlement, and the ground surface above the BMH would be returned to its preexisting condition.

- **Terrestrial Cable:** New terrestrial cable would be placed in underground conduit, which would generally consist of 4-inch diameter HDPE extending from the BMH to the third-party utility transition points. The conduit would be installed either via trenching or drilling. Trenching would consist of a 2-foot-wide by 3 to 4-foot-deep excavation along the cable alignment using a mini excavator. The conduit for the cable would then be laid in the open trench, and the area would be backfilled with native soil, returning the area to its pre-existing condition. Drilling would entail a similar approach as described in Section 2.5.4, but on a smaller scale (i.e. smaller entry hole excavation, smaller laydown areas, etc.); drilling depths would be approximately 4-10 feet, depending on the site.[11] Once the conduit is in place, the cable would be pulled into place using pull line (or similar).
- **Cable Landing Station (CLS):** CLS sites involving new modular structures and/or emergency generators would be cleared and leveled using a medium track excavator (or similar) and a concrete slab foundation or pilings would be installed. Once the foundation is complete, the modular structure would be set in place using a crane, then fastened to the foundation. The emergency generator would also be set in place, and any conduit needed to connect the CLS to nearby utilities would be installed. The overall extent of disturbance from these construction activities would range from approximately 1,000 to 1,500 square feet, depending on location.[12] Following construction, any temporarily disturbed areas would be returned to pre-existing grade and conditions.

Overall, onshore construction is expected to require between 2 to 12 weeks per cable landing site. BMH installation would require up to 2 weeks per site (or less, in most cases); the additional duration of construction at each site would be dependent on the extent of underground conduit needed for terrestrial cable installation and CLS construction.[13] Throughout the duration of construction, all active work areas would be secured, with temporary ground excavations (such as for BMH or conduit installation) covered during non-work periods, to ensure public safety. Following construction, temporarily disturbed areas would be revegetated; this would involve application of hydroseeding using a suitable mix of non-invasive grass species and/or species already found at each of the sites.

[11] For these shorter and less complex HDDs, the drill string may be pulled back through the drilled pilot hole rather than left in place.

[12] The only ground disturbance for the Kauaʻi CLS would be associated with installation of an emergency generator (less than 100 square feet). No ground disturbance or other construction would be required for either the Oʻahu or Lānaʻi CLS.

[13] The various onshore construction activities would be timed to occur in parallel, to the extent practicable; however, specific timing will depend on various factors, including permitting requirements, weather, and contractor availability.

Table 2-14. General Type and Approximate Quantities of Construction Equipment

HDD and Beach Manhole	
(1) Drill Rig (12,000-84,000 lbs. typical)	(1) Tricone Pilot Hole Bit (and other drilling bits)
(1) Drilling Fluid Reclamation Unit and Safe Storage	(1) Centrifuge
(2) Positive Displacement Drilling Unit Pumps	(1) Gyroscopic Steering System
(1) Powershift Downhole Adjustable Drill Motor	(1) Crane
(1) Excavator	(1) Loader
(1) Dump Truck	
Terrestrial Cable	
(1) Rubber Tracked Excavator	(1) Dump Truck
(1) Skid Steer	(1) Compactor
(1) Loader	(1) HDD Drill Rig - Mini
Cable Landing Station (CLS)	
(1) Medium Track Excavator	(1) Generator
(1) Skid Steer/Loader	(1) Crane (to place/set modular CLS)
Subsea Cable Installation	
(1) Dedicated Cable Lay Ship	(1) Excavator (to support cable landing)
(1-2) Support Vessels	

2.5.6 Subsea Cable Installation

Following construction and preparation of the onshore cable landing facilities, the subsea cable would be deployed from a specialized cable lay ship, purpose-built with advanced positioning capabilities; a detailed specification sheet is contained in Appendix B. The offshore cable lay would be completed directly by this dedicated cable ship, with one to two support vessels used to assist during nearshore cable landing operations; the support vessels would be smaller boats, sourced from local entities or vessel providers. An example of a cable ship and support vessels are shown in the image at right. The cable ship would utilize a dynamic positioning system offshore to facilitate installation, allowing the cable to be floated to the nearshore HDD punchout points. This approach would avoid the need for multipoint anchor spreads or associated impacts to the seabed from a shallow-water cable barge.



Example of Cable Ship with Support Vessel

For each HDD landing, the cable ship would begin deployment of the subsea cable while onboard crew attach suspension floats at regular intervals as needed to allow the cable to be floated toward the HDD punchout by the landing support team (i.e. divers, support vessel(s) and/or similar means). Once the cable reaches the HDD punchout, the floats would be removed by the landing support team, allowing the cable to sink toward the HDD conduit at the proper angle. Divers would help feed the

cable into the HDD conduit by attaching it to the previously installed pilot line. The cable would then be pulled through the HDD conduit toward the BMH using onshore equipment positioned near the BMH; divers and/or small vessels would facilitate the installation process by guiding the cable into the conduit with the floats progressively removed as the cable enters the HDD conduit. Once the cable has been pulled ashore, it would be secured within the BMH, where it would then be spliced to the terrestrial cable. Any remaining floats would be removed offshore, allowing the subsea cable to sink to the seabed. Divers would help to position the cable along the engineered cable route as needed through the nearshore waters, with micrositing to minimize impacts to the extent practicable. Real-time monitoring would be used to control the cable deployment parameters, and the specific cable route would be in accordance with a detailed cable laying plan based on site-specific characteristics. No trenching or burial would be required for installation of the subsea cable beyond the HDD punchouts.

In total, installation of the subsea cable is expected to take approximately 50-60 days, depending on weather and ocean conditions. Offshore installation typically involves 24-hour operations, weather and sea conditions permitting. The nearshore landing operations would occur during daylight in suitable conditions (calm weather and minimal swell) and are anticipated to take approximately one day per cable landing site. The cable ship and support vessels would comply with applicable federal and state regulations and conventions addressing navigational safety, safety procedures, environmental protection, and pollution prevention measures. Additionally, a Local Notice to Mariners would be issued through the U.S. Coast Guard (USCG) and other appropriate channels in the weeks prior to commencement of installation activities to alert other vessels of the cable ship's presence, expected time in the area, and relevant contact information.

2.5.7 Site Access During Construction

As described above, a temporary construction work area would be established at each cable landing site, located entirely within the Project Area as shown in Figures 3.1 through 3.6. Security fencing (up to 8 feet high) would be installed around the temporary work area for the duration of construction as needed to ensure public safety. Public access to the surrounding areas – including the shoreline, beach, and any nearby recreational or harbor facilities – would be maintained at all cable landing sites throughout construction.

For certain onshore construction activities (e.g., installation of underground conduit), temporary lane closures and/or parking restrictions would be necessary in some locations; these are expected to include Kauaʻi Beach Drive, Kauaʻi Beach Road, and Kūhiō Highway (Kauaʻi); Barbers Point Beach Park parking lot (Oʻahu); Kahului Beach Road and UH Maui College campus entrance road (Maui); Mānele Harbor parking lot (Lānaʻi). Vehicular access would be maintained and appropriate signage and traffic controls would be implemented as needed to minimize traffic impacts and ensure safety; further detail regarding traffic-related impacts is provided in Section 3.14.

Nearshore and offshore waters would remain open to recreational and/or commercial activities (e.g., boating, surfing, or fishing) throughout construction, including during HDD and subsea cable installation. Offshore activities associated with HDD conduit installation would generally be limited to the final day of drilling, when punching out onto the seafloor; divers would be present, with an

accompanying barge or vessel. Similarly, subsea cable installation is also expected to require approximately one day per cable landfall; a cable installation vessel would be stationed at each site, along with divers and support vessels. For both of these activities, a 300-foot buffer zone would be maintained to keep patrons and vessels out of the work area for safety purposes. These activities would not restrict harbor access or any other nearshore or offshore activities. Once installed, all cable landfall infrastructure would be located at or beneath the ground surface and would have no bearing on public access.

2.6 Project Operation and Maintenance

Following installation and testing, the system would be actively monitored and maintained over its operational lifetime. Specifically, the system would include line monitoring equipment that would monitor the signal strength of the subsea cable. In the event of signal deterioration, the network operations system would be used to pinpoint the location of the signal disruption. In the event a weakened or lost signal is detected, Automatic Identification System (AIS) and/or satellite imagery would be used to identify and subsequently notify any nearby vessels that may pose a security risk; these techniques would also be used to prevent vessels from anchoring near the subsea cable. Given the durability of the fiber optic cable and use of proven installation methods, the need for subsea cable repairs or other maintenance along the subsea cable segments is expected to be minimal. Repairs would likely be limited to recovering and replacing short spans of damaged cable; such incidents of cable damage are rare, with an expected likelihood of only one or two incidents over the Project lifespan.

As further discussed in Sections 3.1 and 3.3, the cable landfall infrastructure is specifically designed and built for the coastal environment and as such, would be resilient to coastal erosion and flooding. Regardless, each cable landfall would be monitored over the life of the Project for evidence of erosion or increased coastal flooding. Although unlikely to be required, potential erosion could be addressed using imported fill to stabilize buried infrastructure as needed. If facilities become exposed, it is also possible to re-bury the facilities at a lower elevation to maintain the design ground clearance. Other activities over the course of the Project's operational period would include routine monitoring and replacement of CLS equipment as needed; each emergency generator would also be tested on a monthly basis to ensure it remains in proper working order.

2.7 Cable System Retirement

While the design life of subsea fiber optic cable is approximately 25 years, these systems typically continue to have operational value despite diminished capacity relative to new technologies. Subsea cables can also be re-purposed to fulfill other needs without the need for commercial data transmission (e.g., scientific research, climate and ocean observations, maritime security monitoring, etc.). To this end, the HIFL system is intended to operate for as long as it continues to have value. As the system reaches the end of its design life, the capacity of the cable would be evaluated on a regular basis to assess continued commercial viability. Once the system is determined to be no longer commercially viable, the decision to continue use of the cable for other purposes would be based on the needs at that time, in conjunction with the relevant agencies.

The system would be retired when it is determined that there is no further practical use for the subsea cable. As evidenced in other subsea cable systems around the world, it is anticipated that over the system's operational period, substantial portions of the cable would be either self-buried or colonized with coral. As such, a comprehensive evaluation of the environmental conditions along the subsea cable route would be conducted to assess the potential impacts associated with cable removal. In many cases, it is preferred to leave retired cable in place to avoid unintended environmental impacts; this decision would be made in coordination with the applicable regulating agencies at that time. If it is determined that the cable should be removed, specialized vessels would be used to recover the cable from the seabed; the retired cables would be recycled or otherwise properly disposed of in accordance with state and local regulations. Additional details regarding cable system retirement are provided in Appendix E.

2.8 Project Cost

The cost to construct the Project is estimated to be approximately $135-140 million. As described in Section 1, the Project would be partially funded by the State of Hawai‘i using federal funding sourced from the U.S. Treasury CPF program. The remaining funds would be provided by ONI through private equity and/or secured debt. Through the public-private partnership, the state would retain a 20 percent interest in the Project as well as dedicated fiber capacity on the HIFL system.

2.9 Project Schedule

The approximate durations of the various construction activities required for each Project component per cable landing site are described throughout Section 2.5. In total, construction could require approximately three to four months per cable landing site, followed by subsea cable installation, which is expected to require a total of approximately two months, followed by system testing. However, to the extent practicable, onshore construction activities would be timed to occur in parallel (rather than in sequence), so as to minimize the overall duration of construction and related impacts. The current goal is to achieve operational status by the end of 2026; however, construction of the Project would not commence until all necessary permits, approvals, and agreements are in place.

3 AFFECTED ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

This section describes the affected environment and potential impacts of the Project relative to applicable environmental resources. In accordance with HRS Chapter 343 and HAR Section 11-200.1, the description of the affected environment focuses on those resources and conditions potentially impacted by the Project, with the level of detail commensurate with the importance of the impact; resources that are not present (or otherwise do not apply) are not discussed. Mitigation measures or BMPs that would be implemented to avoid or minimize potential impacts are identified, where relevant. Alternatives to the Project are evaluated in Section 4.

As previously described, in addition to the proposed subsea cable and onshore cable landing infrastructure, the Project would use existing infrastructure, including fiber that is owned and operated by a licensed utility as part of the existing utility system as well as existing buildings on UH-owned campuses.[14] As these components comprise existing infrastructure and would not involve any ground disturbance or new construction, they are not addressed herein.

3.1 Climate and Climate Change

3.1.1 Affected Environment

The Hawaiian Islands have a semi-tropical climate, characterized by relatively mild temperatures and moderate humidity (except at high elevations), persistent northeasterly trade winds, and infrequent, severe storms. The summer months (May through September) are typically warmer and drier, with minimal storm events; trade winds are prevalent 80 to 95 percent of the time, when high pressure systems tend to be located north and east of Hawai‘i. During the winter months (October through April), the high-pressure systems are located farther to the south, decreasing the prevalence of the trade winds to about 50 to 80 percent of the time (WRCC 2025). Local climate conditions in Hawai‘i are also influenced by the rugged, mountainous topography, with drier and warmer conditions on the leeward side and wetter and cooler conditions on the windward side of each island.

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other aspects of the earth’s climate, which has been widely attributed to increased emissions of greenhouse gases (primarily carbon dioxide [CO_2], but also methane and nitrous oxide). Concentrations of atmospheric CO_2 have increased approximately 45 percent over background levels, from 280 to over 410 parts per million, which is the highest level to occur in at least two million years (IPCC 2021). The impacts of climate change in Hawai‘i have been broadly investigated and are well documented; these include increasing air temperatures and associated heat waves, declining trade winds and rainfall levels, increasing intensity and frequency of extreme weather events, increasing ocean temperature and acidification, and rising sea levels (Climate Change Commission 2018).

[14] While the Kaua’i CLS would comprise space in an existing building, an emergency generator would be installed on the KCC campus; as such, the existing conditions and potential impacts associated with installation of the emergency generator at KCC are evaluated.

The mapped extent of potential sea level rise in Hawai‘i has been published via the *State of Hawai‘i Sea Level Rise Viewer*, the result of a collaborative effort led by the UH Sea Grant College Program in partnership with DLNR and the State of Hawai‘i Office of Planning (Hawai‘i Climate Change Mitigation and Adaptation Commission 2021). The viewer identifies the sea level rise exposure area (SLR-XA) based on composite mapping of the projected extent of chronic inundation due to (1) passive flooding (i.e. high tide flooding), (2) annual high-wave flooding, and (3) coastal erosion. Modeling of these hazards is based on four future sea level rise scenarios according to projections in the 2013 Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (IPCC 2014): 0.5 feet, 1.1 feet, 2.0 feet and 3.2 feet. Figures 4.1 through 4.6 show the SLR-XA for the 1.1-foot, 2.0-foot, and 3.2-foot scenarios at each cable landing site.

It is important to note that recent projections of global and regional sea level rise published by the National Oceanic and Atmospheric Administration (NOAA), based on mean sea level rise scenarios from the IPCC Sixth Assessment Report (IPCC 2021), indicate increased confidence in sea level rise projections, including increased magnitude and frequency of coastal flooding from high tide and storm surge flood events resulting in significant consequences to coastal infrastructure, communities, and ecosystems. Based on different greenhouse gas emissions and associated global warming and ice sheet melt projections, the most recent intermediate (mid-range) estimate for Hawai‘i is a rise of 1.0 feet by 2050 and 3.9 feet by 2100 (relative to sea level in the year 2000) (Sweet et al. 2022, Hawai‘i Climate Change Mitigation and Adaptation Commission 2022).

3.1.2 Potential Impacts and Mitigation Measures

A minor amount of greenhouse gas emissions, which contribute to climate change, would result from construction of the Project, in the form of exhaust from construction equipment, vehicles, the cable ship, and support vessels. However, these emissions would be temporary and localized and would not measurably contribute to regional or global greenhouse gas levels. Furthermore, Project vehicles and equipment would be maintained in proper working order and in compliance with federal and state emissions standards, thus minimizing emissions to the extent possible. As such, construction of the Project would be expected to have a negligible, short-term impact on greenhouse gas emissions and climate change. Once operational, the Project is expected to require extremely limited use of vehicles and equipment, generally limited to routine maintenance and occasional repairs, resulting in little to no impacts on greenhouse gas emissions and climate change.

Although the Project is not expected to contribute to climate change, it could be subject to the effects of climate change, particularly sea level rise.[15] As the subsea cable must make landfall to interconnect with each island’s telecommunication network, the Project is shoreline-dependent and requires infrastructure to be located in the coastal environment; virtually all of Hawai‘i’s shorelines are expected to be subject to some degree of coastal inundation due to sea level rise. While it is not possible for the Project to entirely avoid the sea level rise exposure area, the extent and nature of

[15] Climate change could also increase the frequency and severity of certain natural hazards, such as flooding and hurricanes; these are discussed in Section 3.3.

projected sea level rise impacts were carefully considered in the site selection and design refinement process to minimize the risk of exposure while balancing other technical requirements.

Subsea cable systems, including the BMH and HDD conduit, are resilient to coastal flooding as they are specifically designed and built for the marine environment. Regardless, the Project incorporated a minimum design standard based on the 1.1-foot SLR-XA, as this roughly equates to the current mid-range projection for 2050, which generally corresponds to the design life of the subsea cable system. As such, the BMH and all terrestrial infrastructure extending inland from the BMH at each cable landfall has been sited outside the 1.1-foot SLR-XA, at a minimum. Where practicable, this infrastructure has been set back further, beyond the 2-foot and/or 3.2-foot SLR-XA. In all cases, the BMH and other terrestrial infrastructure has been sited inland of the maximum projected coastal erosion boundary, where mapped.

As further discussed in the following sections, three of the cable landing sites (Maui, Lānaʻi, and Hawaiʻi Island) would involve no infrastructure within the SLR-XA beyond the HDD conduit installed under the shoreline. For the cable landing sites on Kauaʻi, Oʻahu, and Molokai, the BMH and a limited amount of terrestrial conduit would be within the 2.0-foot or 3.2-foot SLR-XA, but based on current projections, these are areas that are only expected to be subject to inundation over the longer-term (beyond the design life of the project). The cable landing sites would be monitored on a regular basis over the Project lifespan, including inspections following severe storms, to identify potential impacts of coastal flooding and erosion from large wave events. Although unlikely to be required, potential erosion could be mitigated using imported fill to stabilize buried infrastructure and/or by re-burying the facilities at a lower elevation to maintain ground clearance; chronic BMH inundation could be addressed through installation of a riser. Potential inundation due to sea level rise is not expected to affect any of the CLS facilities. For these reasons, the Project is expected to be resilient to sea level rise over the expected life of the subsea cable system such that no significant impacts are anticipated.

3.1.2.1 Kauaʻi Cable Landing Site

In the vicinity of the proposed landfall for the Kauaʻi cable landing site, Nukoliʻi Beach Park is largely within the 3.2-foot scenario SLR-XA (see Figure 4.1). In this location, the modelled extent of sea level rise is primarily driven by annual high wave flooding; the projected extent of passive flooding and coastal erosion associated with the 3.2-foot sea level rise scenario is considerably closer to the shoreline.

The HDD conduit would be installed under the shoreline, with the BMH located more than 150 feet inland of the projected extent of the 2.0-foot scenario SLR-XA (as well as the maximum projected extent of coastal erosion associated with sea level rise). As the BMH is designed to tolerate periodic inundation and any potential effects of sea level rise associated with the 3.2-foot scenario SLR-XA are not anticipated to occur until well beyond the infrastructure design life, significant Project-related impacts due to sea level rise are not expected to occur. As noted above, the infrastructure would be routinely monitored and any potential issues associated with erosion or inundation, although unlikely, would be mitigated as needed.

3.1.2.2 Oʻahu Cable Landing Site

Nearly all of Barbers Point Beach Park falls within the 3.2-foot SLR-XA (see Figure 4.2). In this location, the modelled extent of sea level rise is primarily driven by annual high wave flooding; the projected extent of passive flooding associated with the 3.2-foot sea level rise scenario is considerably closer to the shoreline.

The two HDD conduits would be installed under the shoreline, with the BMHs located at the inland extent of the 2.0-foot scenario SLR-XA. As the BMH is designed to tolerate periodic inundation, and any potential effects of sea level rise associated with the 2.0-foot and 3.2-foot scenario are not anticipated to occur until well beyond the infrastructure design life, significant Project-related impacts due to sea level rise are not expected to occur. Although the coastal erosion boundary is not mapped at this location, based on mapping in adjacent areas, coastal erosion is not anticipated to be a risk to the Project. In any case, as described above, the infrastructure would be routinely monitored and any potential erosion, although unlikely, would be mitigated as needed.

3.1.2.3 Maui Cable Landing Site

The portion of Kahului Harbor western breakwater area that would be utilized by the Project generally falls outside of the SLR-XA, with only a narrow band of potential exposure area along the northern edge (see Figure 4.3). The two HDD conduits would be installed under the shoreline, with the BMH and other terrestrial infrastructure located nearly 100 feet from the modelled SLR-XA. Although the coastal erosion boundary associated with sea level rise is not mapped at this location, the shoreline is engineered and armored to resist erosion; as such, coastal erosion is not anticipated to be a risk. For these reasons, the Project infrastructure at this cable landfall is not expected to be vulnerable to coastal flooding or erosion based on projected sea level rise.

3.1.2.4 Molokai Cable Landing Site

As with much of the area surrounding Kaunakakai, the proposed cable landfall at Molokai Yacht Club is almost entirely within the SLR-XA, with the modelled extent of sea level rise based on passive flooding (see Figure 4.4). The BMH location falls within the 3.2-foot scenario SLR-XA; portions of the buried conduit for the terrestrial cable would also intersect with the 2.0-foot scenario SLR-XA. However, as previously described, this infrastructure is designed for the marine environment and is resilient to flooding; furthermore, the potential effects of sea level rise associated with the 2.0-foot and 3.2-foot scenario are not anticipated to occur until well beyond the infrastructure design life. Although the coastal erosion boundary is not mapped at this location, coastal erosion is not anticipated to be a risk to the Project because of the protection afforded by the offshore reef. In any case, as described above, the infrastructure would be routinely monitored and any potential erosion, although unlikely, would be mitigated as needed. For these reasons, significant impacts due to sea level rise are not expected to occur.

3.1.2.5 Lānaʻi Cable Landing Site

At the proposed cable landfall at Mānele Small Boat Harbor on Lānaʻi, the SLR-XA is generally restricted to a narrow band along the edge of the harbor and adjacent shoreline (see Figure 4.5). The

HDD conduit would be installed under the shoreline, with the BMH and other terrestrial infrastructure located more than 100 feet inland of the modelled SLR-XA. Although the coastal erosion boundary associated with sea level rise is not mapped at this location, shoreline armoring and the harbor breakwater provide protection from high-energy waves, such that coastal erosion is not anticipated to be a risk. For these reasons, the Project infrastructure at this cable landfall is not expected to be vulnerable to coastal flooding or erosion based on projected sea level rise.

3.1.2.6 Hawai‘i Island Cable Landing Site

At the proposed cable landfall on Hawai‘i Island at PACRC, the SLR-XA includes a very limited area in the immediate shoreline area (see Figure 4.6). The HDD conduit would be installed under the shoreline, with the BMH located more than 300 feet inland of the modelled SLR-XA. Although the coastal erosion boundary associated with sea level rise is not mapped at this location, the shoreline is rocky and somewhat naturally armored; as such, coastal erosion is not anticipated to be a risk. Therefore, the Project infrastructure at this cable landfall is not expected to be vulnerable to coastal flooding or erosion based on projected sea level rise.

3.2 Geology and Soils

3.2.1 Affected Environment

The Hawaiian Islands are situated in the central Pacific Ocean and represent the emergent peaks of a vast underwater mountain chain known as the Hawaiian-Emperor seamount chain, which stretches over approximately 3,900 miles. The regional marine geologic environment surrounding the Hawaiian Islands is defined by deep ocean basins, submerged volcanic structures, and active tectonic processes that reflect the archipelago’s hotspot origin. The islands rise steeply from the abyssal plains of the central Pacific Ocean, with depths exceeding 13,000 feet just offshore, indicating their formation atop the oceanic crust rather than at a plate boundary (Winterer et al. 1978). The Hawaiian Ridge, part of the larger Hawaiian-Emperor seamount chain, consists of both emergent and submerged volcanoes, some of which have eroded into flat-topped guyots or seamounts. The submarine flanks of the islands feature massive landslide deposits, such as the Nu‘uanu and Wailau landslides, which are among the largest on Earth and provide evidence of catastrophic slope failures (Moore et al. 1989). Additionally, the surrounding seafloor is shaped by abyssal hills, volcanic rift zones, and sediment-covered terraces that reflect ongoing volcanic construction, subsidence, and sedimentation. Hydrothermal venting and localized seismic activity near Hawai‘i Island further reveal the persistent geologic activity associated with the underlying mantle plume (Garcia et al. 2006). Together, these features create a complex and dynamic geologic framework that continues to evolve.

3.2.1.1 Kaua‘i Cable Landing Site

3.2.1.1.1 Onshore Setting

Nukoli‘i Beach Park on Kaua‘i’s southeastern coast lies within the Līhu‘e Basin, where shallow bedrock of the Kōloa Volcanics underlies a narrow coastal plain. Landward of the beach, these lava flows are locally mantled by Quaternary alluvium and unconsolidated shoreline deposits composed of light-

colored, carbonate-rich sand and shelly gravel derived from reef sources, with localized beachrock/ sandstone. A thin cover of alluvium and beach sand overlies volcanic bedrock and increases in thickness toward the beach, where it grades into modern beach deposits at the shoreline. Figure 5.1 depicts the mapped distribution of beach deposits, alluvium, and underlying volcanic geology in the Project Area).

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) Database indicates that the shoreline at the landfall comprises Beaches (BS)—coarse, carbonate sand that is excessively drained, highly permeable, saline, and tidally influenced, with frequent coastal flooding and the water table at or near the surface. The BMH lies near the transition to Mokuleia fine sandy loam (Mr) on the coastal plain, a well-drained alluvial soil with fine sandy loam over sand, low water-holding capacity, and a deeper groundwater table (generally >7 feet) (NRCS 2025). The proposed HDD alignment would traverse the beach sands at the shoreline and Mokuleia alluvium inland, with potential transition to volcanic units at depth (Figure 6.1).

A geotechnical investigation conducted to support the HDD design encountered the following general sequence (rounded): (1) near-surface fill and recent alluvium of clayey silt to about 10 feet; (2) shallow marine deposits of silty to gravelly coralline sand to about 20 feet; (3) older alluvium/saprolite of basaltic silty sand and clayey silt to about 35 feet; (4) vesicular basalt to about 70 feet; (5) thin interbeds of volcanic ash/residual soil with clinker (silty gravel/sandy silt) from roughly 70–100 feet; and (6) alternating basalt and clinker (including welded clinker) continuing to the termination depth of 170 feet. Groundwater in the boring stood at approximately 6 feet during drilling and about 11 feet on the following day; levels are expected to fluctuate with tidal conditions (GeoLabs 2025a).

3.2.1.1.2 Offshore Setting

The nearshore seabed from the shoreline to the proposed HDD punchout is dominated by low-relief hardbottom (“pavement”) that gently slopes seaward, with low rugosity and limited surficial sand. A distinct overhanging ledge/outcrop occurs roughly 4,265 feet offshore in about 65–80 feet of water, trending roughly parallel to shore; this feature represents a likely relict terrace associated with lower sea-level stands. Areas shoreward and seaward of the ledge are characterized primarily by flat pavement with patchy sand veneers, and few geomorphic features. To avoid spanning the ledge face, the HDD punchout was adjusted to be in deeper (approximately 78-foot water depth) low-relief pavement where substrate complexity is lower. Biologic cover is sparse across the pavement, consistent with the predominance of hardbottom and thin sediment veneers.

In general, the seabed comprises coral reef rubble hard bottom with limited areas of unconsolidated sediments before transitioning to a zone of sandy seabed for the remaining portion of the offshore route into deeper water. Geophysical survey and diver investigations along the cable route and around the HDD punchout point confirmed these conditions, as further detailed in Section 3.6.

3.2.1.2 O‘ahu Cable Landing Site

3.2.1.2.1 Onshore Setting

O‘ahu’s southwestern coast lies on the seaward flank of the Wai‘anae Volcano, where volcanic bedrock is locally mantled by Pleistocene reef limestone and modern shoreline sediments (Figure 5.2). At Barbers Point, the NRCS soils mapping indicates that the onshore area is dominated by coral outcrop—exposed reef limestone/cemented carbonate at or near the surface—with beach sands along the immediate shoreline (Figure 6.2). These carbonate units are excessively drained, highly permeable, and have very low water-holding capacity. Shoreline sands are saline and tidally influenced, with frequent coastal flooding and a water table at or near the surface (NRCS 2025).

The HDD conduits would traverse reef-derived carbonate materials and coastal beach deposits along the onshore reach, with possible transition to volcanic units at depth. Surrounding shoreline materials consist of pale, carbonate-rich sands and shelly gravel formed from coral and shell fragments and reworked by surf, with localized sandstone and minor volcanic detritus.

3.2.1.2.2 Offshore Setting

The offshore setting at Barbers Point consists of a gently sloping carbonate shelf characterized by a mosaic of platform reef (low relief hardbottom/pavement) and broad sand sheets with generally low rugosity. The HDD punchouts and surface-laid cable routes have been positioned to favor the sand-dominated seabed, punching out beyond hardbottom pavement. Along the alignment, the mobile nature of nearshore sand results in thin veneers and ripples overlying carbonate substrate. Overall, the offshore geology is a simple, sand-and-pavement regime typical of this reach of O‘ahu’s leeward coast. Further discussion of the existing marine conditions is provided in Section 3.6.

3.2.1.3 Maui Cable Landing Site

3.2.1.3.1 Onshore Setting

Maui was built by two shield volcanoes—West Maui and Haleakalā—that joined to form a single island. The island’s central isthmus is a narrow, low-lying plain between the two edifices, composed of interbedded basaltic lava flows and volcanic tephra (ash and cinder) and locally overlain by younger alluvial deposits and beach sands. The Project Area, which is located on the northern edge of the central isthmus, has been substantially altered by port development and other urban development. The breakwater is an engineered structure armored with quarry stone over compacted embankment, and the adjacent upland is underlain primarily by manmade fill derived from historic harbor dredging (Figure 5.3). These fills are typically poorly sorted, carbonate-rich sand and gravel composed of coral fragments and shell material mixed with terrestrial rock. NRCS soil mapping classifies the area as Fill Land (Fd); composition and thickness vary across short distances (Figure 6.3). Along the immediate shoreline, unconsolidated beach deposits occur as pale, calcareous sands and shelly gravel shaped by wave action.

A geotechnical investigation conducted to support the HDD design indicates the following generalized subsurface sequence (rounded to the nearest foot): (1) fill materials comprising loose to dense silty sands and stiff clayey silts to about 19 feet; (2) lagoonal/marine deposits comprising silty and gravelly

coralline sands to about 53 feet; (3) older alluvium/river-channel deposits comprising stiff clayey silt with very dense silty sands and dense gravelly cobbles to about 60 feet; (4) saprolite comprising medium-dense sands to about 69 feet; and (5) basalt rock with interbedded clinker (sandy gravel) to the maximum explored depth of 137 feet. Groundwater was observed at approximately 17 feet at completion of drilling and 23 feet on the overnight reading; levels are expected to fluctuate with tides and seasonal conditions given proximity to the harbor (GeoLabs 2025b).

The proposed HDD alignment would traverse the engineered breakwater and adjacent reclaimed ground, remaining within unconsolidated fill and beach deposits along its onshore reach before transitioning at depth to lagoonal/marine sands, older alluvium, saprolite, and basalt as summarized above. Figure 5.3 depicts the mapped distribution of engineered fill, beach deposits, and underlying native geology in the Project Area. Surrounding the Project Area, nearshore and back-beach sediments are dominated by carbonate sand and shelly gravel derived from coral and shells, with localized mixtures of reworked volcanic detritus. Upland areas adjacent to the harbor include heavily disturbed urban land and additional fill associated with port infrastructure.

NRCS soil mapping at the Maui CLS identifies PZUE—Puuone sand (7–30 percent slopes), a carbonate dune sand derived from coral and shell deposits (Figure 6.3). The typical profile is loose sand to about 2 feet, underlain by a cemented calcareous horizon at about 2–3.5 feet, with somewhat excessively drained conditions, very low water-holding capacity, and deep groundwater.

3.2.1.3.2 Offshore Setting

Surveys conducted for the Project indicate that from the HDD punchout seaward to roughly 100-foot water depths, the seabed is dominated by continuous, low-relief sand sheets with no channels, scarps, or other major geomorphic features. The sand cover forms broad, somewhat mobile beds of fine- to medium-grained carbonate sediment; rugosity is low. Isolated patches of rock/rubble or thin hardbottom occur locally along and adjacent to the proposed route and are typically overgrown by turf and macroalgae. Overall, the offshore setting is a simple, sand-dominated seabed typical of this coastline. Additional details regarding offshore resources are provided in Section 3.6.

3.2.1.4 Molokai Cable Landing Site

3.2.1.4.1 Onshore Setting

Molokai's south-central coast occupies the low isthmus between the East and West Molokai shield volcanoes, where volcanic bedrock is locally mantled by Pleistocene reef limestone and Holocene lagoonal and beach deposits (Figure 5.4). At the Molokai cable landfall, near-surface materials reflect a tidal-flat setting modified by harbor development. NRCS soil mapping identifies the site as Kealia silt loam (KMW) formed in alluvium over beach sand on tidal flats and salt marshes (Figure 6.4). The typical profile consists of a thin surface silt loam over loam to roughly 2 feet, grading to fine sandy loam and deeper beach sand to about 5 feet and beyond. Kealia soils are poorly drained hydric soils with negligible runoff, frequent flooding and occasional ponding, and moderately to strongly saline conditions. Minor map unit components include salt flats and a Kealia variant with a deeper water table. In developed areas adjacent to the harbor, engineered fill may locally overlie these native soils.

Based on NRCS soil mapping and the harbor setting, typical subsurface conditions comprise variable-thickness dredge/construction fill over Kealia-series soils and underlying beach sand, with a very shallow groundwater table that fluctuates with tides. The proposed HDD alignment would traverse engineered fill (where present) and unconsolidated tidal-flat and beach deposits along its onshore reach, with potential transition to older native materials (including weathered volcanic units) at depth or farther inland.

A geotechnical investigation conducted to support the HDD design indicates the following generalized subsurface sequence (rounded to the nearest foot): (1) fill materials comprising gravelly sand fill to about 1 foot; (2) recent alluvium comprising sandy silt to about 2 feet; (3) marsh deposits comprising clayey silt to about 5 feet; (4) lagoonal deposits comprising silty sands to about 76 feet; (5) marsh deposits comprising silty sand and sandy silt to about 89 feet; (6) alluvium comprising gravelly sand (basaltic) with little cobbles (basaltic) to about 95 feet; and (7) alluvium comprising cobbles and boulders (basaltic) to about 116 feet. Groundwater was observed at approximately 3.5 feet; levels are expected to fluctuate with tides and seasonal conditions (GeoLabs 2025c).

3.2.1.4.2 Offshore Setting

The nearshore seabed off Kaunakakai, Molokai is a broad reef-flat environment with chronic turbidity; daily trade winds and tides resuspend fine terrestrial sediments and the Kaunakakai wharf further limits longshore transport, promoting persistent, mobile fines and low substrate relief. Within the maintained and dredged harbor, the floor is dominated by soft sediments along the channel and margin, with lightly sand-veneered pavement in the outer harbor. Coral hardgrounds are present adjacent to the maintained harbor.

Although survey visibility was poor, survey observations indicate the proposed HDD punchout and initial surface-laid cable route occur on low-rugosity substrate—primarily soft sediment with intermittent thin sand over pavement and coral rubble. Overall, the alignment crosses a low-complexity, somewhat-mobile seabed, avoiding adjacent hardgrounds to the extent practicable. Additional details regarding offshore resources are provided in Section 3.6.

3.2.1.5 Lānaʻi Cable Landing Site

3.2.1.5.1 Onshore Setting

Lānaʻi's south coast lies on the flanks of the Lānaʻi shield volcano, where coastal plains of alluvial and marine sediments overlie volcanic bedrock (Figure 5.5). At Mānele Small Boat Harbor, NRCS soil mapping classifies the onshore area as Sandy Alluvial Land—loamy sand over coarse sand on a low coastal plain (Figure 6.5). These sands are excessively drained, highly permeable, and have very low water-holding capacity. The unit is subject to frequent flooding, is slightly saline, and has a shallow groundwater table typically within about 1–2 feet of the surface near the shoreline. Surrounding areas include sandy and rocky soils (e.g., Jaucas Sand, Very Stony Land, and Rock Land). The proposed HDD alignment would pass beneath these sandy alluvial soils and adjacent beach deposits, with potential transition to volcanic units at depth or farther inland.

A geotechnical investigation conducted to support the HDD design indicates the following generalized subsurface sequence (rounded to the nearest foot): (1) pavement/base comprising concrete (~6 inches) over sandy gravel to about 2 feet; (2) fill comprising silty sand to gravelly sand to about 6 feet; (3) recent alluvium comprising sandy silt to clayey silt to about 10 feet; (4) cinder comprising sandy gravel to about 71 feet; (5) volcanic ash comprising sandy silt to about 81 feet; (6) clinker comprising gravelly sand to about 84 feet; and (7) basalt with interbedded clinker to about 116 feet. Groundwater was encountered at about 17–18 feet; these levels are tidally and seasonally influenced (GeoLabs 2025d).

3.2.1.5.2 Offshore Setting

Project surveys indicate that within Mānele Bay, the seabed from the HDD punchout seaward to about 100-foot water depth is a continuous, low-relief carbonate sand surface with gently sloping bathymetry and low rugosity. The substrate is dominated by mobile sand sheets with localized ripples/small bedforms, and only infrequent, discontinuous occurrences of small rubble or hardbottom. Overall, the offshore setting is a simple, sand-dominated harbor/nearshore floor typical of a fringing-reef lagoonal environment. Additional details regarding offshore resources are provided in Section 3.6.

3.2.1.6 Hawai‘i Island Cable Landing Site

3.2.1.6.1 Onshore Setting

Hawai‘i Island’s east coast is formed by young basaltic lava flows where thin soils locally mantle pāhoehoe and ‘ā‘ā bedrock (Figure 5.6). At the proposed cable landfall site at PACRC, NRCS mapping identifies the site soil as Opihikao–Urban Land complex (2–20 percent slopes) (Figure 6.6). The Opihikao component consists of a thin organic mat (approximately 2–10 inches) over pāhoehoe lava, with bedrock typically within about 1 foot of the surface. These areas are well drained with high runoff and very low water-holding capacity. The Urban Land component represents developed ground (i.e. paved/graded) on the same lava terrain. The proposed HDD alignment would pass beneath this very thin soil mantle and quickly into basaltic bedrock. Along the immediate shoreline, materials are characteristic of Hilo’s basaltic coast—lava benches and basaltic cobble/boulder shorelines with localized pockets of mixed sand and gravel reworked by waves.

NRCS soil mapping at the CLS location at UH Hilo identifies Keaukaha highly decomposed plant material and Panaewa–Urban Land complex (Figure 6.6). Keaukaha is a thin organic mat (about 2–10 inches) over pāhoehoe lava with bedrock typically within about 1 foot; it is well drained with high runoff and very low water-holding capacity. The Panaewa component is volcanic-ash–derived, very stony loam over pāhoehoe with bedrock commonly within about 1–2 feet; it is moderately well drained but of low permeability and may exhibit a shallow perched water table near the surface.

A geotechnical investigation to support the HDD design at Hilo encountered the following general sequence (rounded): (1) near-surface residual soils of silty gravel to gravelly sand with basaltic cobbles to about 3 feet; (2) in one of two borings, very dense basaltic gravelly sand (weathered basalt) to about 12 feet; and (3) basalt bedrock from shallow depth to the boring terminations at approximately 52 feet. No groundwater was observed during drilling (GeoLabs 2025e).

3.2.1.6.2 Offshore Setting

The offshore setting for the Hawai‘i Island cable landing site is characterized by a nearshore zone of very shallow, rocky substrate where basaltic benches and cobble/boulder pavement occurs close to the shoreline with minimal sand veneer and irregular micro-relief typical of this high-energy coast. Farther offshore (deeper than about 33 feet and out to roughly 100 feet), the seabed transitions to a mosaic of elongate hardbottom mounds that follow underlying basaltic ridges separated by sand-filled channels of mobile carbonate sand. Relief is low to moderate and overall rugosity is limited outside the hardbottom mounds; the sand channels provide somewhat broad, low-relief corridors between outcrops. The HDD punchout point and surface-laid cable route target these sandy channels to minimize impacts to coral hardbottom habitat to the extent practicable. Additional details regarding offshore resources are provided in Section 3.6.

3.2.2 Potential Impacts and Mitigation Measures

Overall, the onshore geology and soils at the various cable landing sites are typical of each respective island, with no unique features or landforms within the Project Area. Construction of the Project would not materially change the topography, alter any landforms, or otherwise substantially affect geological resources.

Project-related impacts would include temporary disturbance of soils during construction of the onshore facilities (BMH, underground conduit, and CLS), installation of the HDD conduit, and associated access and staging. Onshore construction activities would involve a limited amount of grading, excavation, and earthmoving. All ground disturbing activities would occur within the established construction work area at each cable landing site (see Figures 3.1 through 3.6). Ground disturbance would be minimized to the extent practicable and is expected to affect less than approximately 1.25 acre per cable landing site. Although the extent of ground disturbance would be limited, construction activities would increase the potential for soil erosion in the form of either fugitive dust or suspended sediment in stormwater runoff. BMPs would be implemented to minimize the potential for construction-related erosion as related to both water quality and fugitive dust, in accordance with applicable erosion control and stormwater management regulations; applicable requirements and associated BMPs are discussed in Sections 3.4.2 and 3.10.2.

The HDD alignments have been designed with offshore punchout points to avoid impacts to the shoreline. The HDD punchout points and cable route were preferentially selected to be in areas of loose, unconsolidated sediment to the extent practicable, with micrositing based on dive survey results, thus minimizing impacts to corals and hardground. As described in Section 2.5.4, standard controls and BMPs would be used during HDD to minimize sediment dispersal and to manage drilling fluid returns. The level of disturbance to seabed sediments during both HDD and cable installation would be insignificant compared to natural nearshore sediment movement.

Given the limited footprint of the Project and implementation of BMPs, soil-related impacts would be minor, localized, and temporary. Over the long term, operation and maintenance of the Project would involve little to no ground disturbance and therefore would not be expected to contribute to erosion or other soil-related impacts.

3.3 Natural Hazards

A natural hazard is a naturally occurring event that could negatively affect people, infrastructure, and/or the environment. Flooding, tsunamis, hurricanes and tropical storms, and earthquakes are natural hazards that have the potential to occur in the Hawaiian Islands and could impact the Project.

3.3.1 Affected Environment

3.3.1.1 Flooding

Potential flood hazards are identified by the Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP) and are mapped on the Flood Insurance Rate Maps (FIRM). The maps classify land into specific zones depending on the potential for flood inundation. The flood zone classifications for the Project Area were obtained from the Hawai‘i NFIP Flood Hazard Assessment Tool (FHAT; DNLR NFIP 2025). The flood zone classifications for the onshore portions of the Project are listed in Table 3-1 and shown in Figures 7.1 through 7.6.

As the subsea fiber optic cable must be brought ashore on each island, it is necessary for certain infrastructure (e.g., the HDD conduit and in some cases, the BMH) to be within the coastal flood zone (Zone VE). At some of the cable landing sites (particularly those on O‘ahu and Molokai), areas adjacent to the shoreline are also within the 100-year floodplain (Zone AE), such that the infrastructure must also extend across this zone. With the exception of the Molokai CLS, all of the CLS sites would be in areas classified as either Zone X or D (i.e. undetermined flood risk or outside of the 500-year floodplain). In the case of Molokai, much of Kaunakakai town falls within the 100-year floodplain, including the Molokai Education Center.

Table 3-1. Summary of Flood Zones[1/]

Cable Landing Site	Cable Landfall			CLS[2/]
	HDD Conduit	BMH	Terrestrial Cable	
Kaua‘i	Zone VE and X	Zone X	Zone X	Zone X
O‘ahu	Zones VE, AE, and D	Zone D	Zones D	N/A
Maui	Zone VE	Zone VE	Zone VE	Zone X
Molokai	Zones VE and AE	Zone AE	Zone AE	Zone AE
Lāna‘i	Zones VE, AE, and X	Zone X	Zone X	N/A
Hawai‘i Island	Zone VE	Zone VE	Zone VE	Zone X

1/ FIRM flood zone designations (FEMA 2025):
AE – Areas of 100-year flood, base flood elevation determined.
X – Areas determined to be outside the 500-year floodplain.
D – Areas in which flood hazard is undermined.
VE – Areas of 100-year coastal flood with velocity (wave action), base flood elevations determined (Coastal High Hazard District).
2/ As the CLS on O‘ahu and Lāna‘i would only involve placement of equipment within an existing building, flood risk at these locations is not addressed.

3.3.1.2 Tsunami

A tsunami is a series of ocean waves generated by sudden displacements in the sea floor, landslides, or volcanic activity, including those caused by disturbances locally as well as events around the Pacific Rim. Tsunami hazards include not only powerful waves, but also debris within the waves and

flooding of low-lying areas. A total of 32 tsunamis with runup greater than 3.3 feet have occurred in Hawai‘i since 1811 (USGS 2020).

Maps prepared using information from the Hawai‘i Emergency Management Agency (HiEMA) and NOAA Office for Coastal Management define the tsunami evacuation zone based on distant tsunami events that have previously impacted Hawai‘i during the past 100 years (HiEMA 2025). Given the shoreline dependent nature of the Project, all of the cable landing sites would require infrastructure (namely, the HDD conduit and BMH) within the tsunami evacuation zone. Given the extent of the tsunami zone and location of UH-owned infrastructure on Maui and Molokai, the CLS for these islands would also be within the tsunami evacuation zone (Figures 6.1 through 6.6).

In general, the tsunami hazard risk is highest for the cable landfall areas at Nukoli‘i Beach Park (Kaua‘i), Barbers Point (O‘ahu), Kahului Harbor (Maui), and PACRC (Hilo, Hawai‘i Island), as these are areas with a gentle coastal slope and history of tsunami flooding with damage. The hazard risk for the cable landfall area at Mānele Small Boat Harbor (Lāna‘i) is considered to be moderately high (i.e. areas with steep coastal zone slope and history of tsunami flooding with damage), while the area including Molokai Yacht Club (Molokai) is considered to have a moderately low risk (i.e. areas with steep coastal zone slope and history of tsunami flooding without damage) (Fletcher et al. 2002). The evacuation zone extent and hazard risk intensity for each cable landing site is summarized below.

Table 3-2. Summary of Tsunami Hazard Risk and Evacuation Zone Ratings

Cable Landing Site	Tsunami Evacuation Zone		Hazard Risk
	Cable Landfall	CLS[1]	
Kaua‘i	Yes	No	High
O‘ahu	Yes	N/A	High
Maui	Yes	Yes	High
Molokai	Yes	Yes	Moderately Low
Lāna‘i	Yes	N/A	Moderately High
Hawai‘i Island	Yes	No	High

1/ As the CLS on O‘ahu and Lāna‘i would only involve placement of equipment within an existing building, tsunami risk at these locations is not addressed.

3.3.1.3 Hurricanes and Tropical Storms

A hurricane is a tropical cyclone that develops over warm tropical oceans and has sustained winds that exceed 74 miles per hour (mph); tropical storms are similar to hurricanes but have sustained winds less than 74 mph. These events can cause considerable damage as a result of high winds, marine overwash, and heavy rains. Given the steep and complex topography of the islands, wind can amplify across ridges and through channels, and rain can be focused down valleys, resulting in destructive flash floods and landslides. Passing storms that do not directly intersect with the islands can still generate significant wind and swell, resulting in destructive waves, marine overwash, and coastal erosion (Fletcher et al. 2002).

The hurricane season in Hawai‘i runs from June 1 to November 30. Based on historical data, an average of four to five hurricanes form in the central Pacific region each year (Fletcher et al. 2002; Schroeder 1993). Only four hurricanes have significantly affected the Hawaiian Islands over the past

63 years (WRCC 2025). Of these, Hurricane Iniki (1992), is considered one of the most destructive hurricanes in recorded history; this storm made landfall on Kauaʻi with sustained winds of 145 mph (Category 4) and caused over $3 billion in damages (Blake et al. 2007). More recent events include Hurricane Iselle (2014), which mainly affected Hawaiʻi Island with up to $325 million in damages (Kimberlain and Brennan 2018; NOAA 2019). Tropical storms occur more frequently than hurricanes and typically pass sufficiently close every 1 to 2 years to affect the weather in some part of the Hawaiian Islands (WRCC 2025).

3.3.1.4 Earthquakes and Seismicity

Seismicity refers to the geographic and historical distribution of earthquakes; earthquakes in Hawaiʻi are generally linked with volcanic activity. Numerous small volcanic earthquakes take place every year, primarily beneath Hawaiʻi Island, and are triggered by eruptions and magma movement within the presently active volcanoes of Kīlauea, Hualalai, Mauna Loa, and Lōʻihi. Approximately 30 earthquakes with a magnitude 6.0 or greater have occurred in Hawaiʻi since 1868 (USGS 2019a).

The Seismic Design Category (SDC) is determined based on seismic hazard maps developed by FEMA and USGS and is used by the International Building Code (IBC; as adopted in the Hawaiʻi State Building Code) to inform building design requirements such as structural reinforcement, foundation design, and detailing to resist earthquake forces (FEMA 2024). The SDC ratings range from Category A (lowest seismic risk) to Category E (highest seismic risk). The ratings indicate the highest risk on Hawaiʻi Island and decrease away from the seismic source (i.e. volcanic hot spot) to the northwest along the island chain (FEMA 2025). A summary of the SDC ratings is provided in Table 3-3.

Table 3-3. Summary of Seismic Hazard Risk

Cable Landing Site	SDC Rating[1/]	Earthquake Hazard and Potential Effects of Shaking
Kauaʻi	B	Moderate shaking: Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
Oʻahu	C	Strong shaking: Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built structures.
Maui	D_0	Very strong shaking (the higher the value, the stronger the shaking): Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures.
Molokai	D_0	
Lānaʻi	D_0	
Hawaiʻi Island	D_2	

1/ The SDC listed above are based on the IRC SDC map for default conditions for Hawaii. These are used to estimate seismic risk and do not account for site specific soil conditions.

3.3.2 Potential Impacts and Mitigation Measures

3.3.2.1 Flooding

Given the shoreline-dependent nature of subsea fiber optic cable systems, the Project would require installation of cable landfall infrastructure within the coastal flood hazard zone on each island. Several of the cable landing sites, particularly Oʻahu and Molokai, also include 100-year floodplain extending inland from the coastal zone thus necessitating additional infrastructure within the flood hazard zone to accommodate the cable landfall. While it is not possible for the Project to avoid

placement of infrastructure within these flood hazard zones, all of the cable landfall infrastructure (including the HDD conduit, BMH, and terrestrial cable conduit) would be installed underground. Construction and operation of this infrastructure would not alter existing drainage patterns within the flood hazard zone. Furthermore, as cable landfall infrastructure is designed and built for the marine environment, it would be able to withstand inundation, should such conditions occur. The system would incorporate waterproof and corrosion-resistant materials, would be structurally engineered to resist hydrostatic pressure, and would be properly buried with suitable backfill to prevent water accumulation. These measures would ensure durability and functionality over the lifespan of the Project. As such, the cable landfall infrastructure is not expected to be significantly affected by potential flooding, nor would it contribute to an increased risk or intensity of flooding.

With the exception of Molokai, all of the CLS facilities would be located within either Zone X or D (i.e. undetermined flood risk or outside of the 500-year floodplain); the NFIP does not impose development restrictions within either of these zones since they are not identified as high-risk flood zones. In the case of Molokai, the CLS and associated underground conduit to interconnect with the Molokai Education Center would be within the 100-year floodplain (Zone AE). The new modular structure would be constructed in accordance with NFIP (44 CRF § 60.3) and Maui County Code (Chapter 16.29) requirements for non-residential buildings within flood zones, including elevating the structure to the base flood elevation. Drainage would be designed to divert surface waters away from the structure without increasing the risk of flooding to nearby structures. The Project would obtain a flood development permit, as applicable, from the Maui County Department of Public Works (DPW), Engineering Division.

As the Project would comply with all applicable building codes and standards, it would not be expected to increase flood risk or severity within any flood zone, nor is there is expected to be a significant risk of potential flooding impact on the proposed infrastructure.

3.3.2.2 Tsunami

As described above, the Project is shoreline dependent and thus cannot avoid placement of cable landfall infrastructure within the tsunami evacuation zone. However, all of the cable landfall infrastructure would be installed below ground and would be resilient to periodic flooding (see Section 3.3.2.1). As such, this infrastructure is not expected to be affected by wave action or flooding associated with a tsunami, nor would it contribute to hazards associated with tsunami inundation.

The only aboveground infrastructure that would be constructed within the tsunami evacuation zone is the CLS for the Maui and Molokai cable landing sites, which would be located at the UH Maui College and Molokai Education Center (respectively). These facilities would be designed and constructed in accordance with the applicable regulations for buildings within the Tsunami Design Zone (as defined in the ASCE 7 Tsunami Design Geodatabase), including the Hawai‘i State Building Code and American Society for Civil Engineers (ASCE) 7-16 standards for tsunami loads and effects. As these facilities would comply with applicable building codes and standards, the CLS infrastructure would be protected from tsunami wave action and flooding to the extent practicable. Although the likelihood of a tsunami event – either during Project construction or operations – is minimal, appropriate precautions would be taken in the event of a tsunami warning. Large pieces of equipment would be

secured, as appropriate, and staff would evacuate to a designated safe zone until the warning is lifted. With implementation of these measures, the Project would not be expected to result in significant impacts related to tsunami events.

3.3.2.3 Hurricanes and Tropical Storms

All of the cable landfall infrastructure associated with each cable landing site (including the HDD conduit, BMH, and terrestrial cable) would be installed below ground and thus would not be affected by hurricane-force winds or marine overwash. Discussion of potential impacts and measures related to flooding is provided in Section 3.3.2.1.

New aboveground infrastructure would comprise modular structures at the CLS sites on Maui (UH Maui College), Molokai (Molokai Education Center) and Hawai'i Island (UH Hilo), as well as an emergency generator on Kaua'i (KCC). These structures would be designed in accordance with state and county building requirements, thus mitigating potential adverse effects in the event of a hurricane or tropical storm. Although the likelihood of a hurricane – either during Project construction or operations – is relatively low, appropriate precautions would be taken in the event of a hurricane warning. Large pieces of equipment would be secured, as appropriate, and staff would evacuate to a designated safe zone until the warning is lifted. With implementation of these measures, the Project would not be expected to result in significant hurricane-related impacts.

3.3.2.4 Earthquakes and Seismicity

As described above, the seismic risk is highest on Hawai'i Island and decreases to the northwest, with the least risk on Kaua'i. To address the potential seismic risk, specific to each cable landing site, all Project infrastructure including underground components would be designed and constructed in accordance with the applicable regulations for underground utilities in seismic zones, including the Hawai'i State Building Code, IBC, and ASCE 7-16 standards for seismic forces and ground movement. During construction, the construction safety manager would be responsible for implementing procedures in accordance with the site-specific safety plan to ensure the safety of workers in the event of an earthquake. With implementation of these measures, the Project would not be expected to result in significant hurricane-related impacts.

3.4 Onshore Water Resources

3.4.1 Affected Environment

Onshore water resources include surface water features (e.g., wetlands, rivers, streams, springs, ditches, and lakes) as well as groundwater. Surveys for wetlands, streams, and other surface waters were conducted at each of the cable landing sites in 2024 and 2025. The focus of these surveys was to identify surface water features within the Project Area and determine whether those may qualify as potential Waters of the U.S., subject to regulation under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. The results of these surveys are summarized below; detailed delineation reports for those sites containing potential Waters of the U.S. will be submitted to the U.S. Army Corps of Engineers (USACE) for review and verification as part of the permitting process. Further

discussion of compliance with Clean Water Act Section 404 and Rivers and Harbors Act Section 10 is provided in Section 5.1.

Groundwater refers to subsurface water resources occurring in geological formations called aquifers. In Hawai‘i, groundwater generally occurs in three distinct geologic systems: (1) fractured and porous basalt (i.e. basal or high-level groundwater),[16] (2) “caprock” marine and alluvial sediments that overlie basal, basalt formations in some coastal areas, and (3) perched groundwater trapped above the normal water table by a localized, low permeability layer in rock or soil (HDOH HEER 2021). Groundwater resources across the Hawaiian Islands have been delineated by the Commission on Water Resource Management (CWRM) into a series of hydrologic units for management purposes, primarily based on geologic and hydrologic characteristics (CWRM 2019). The State of Hawai‘i Department of Health (HDOH) Safe Drinking Water Branch also delineates groundwater resources based on an Underground Injection Control (UIC) Line. Areas makai (toward the ocean) of the UIC line have an underlying aquifer that is not a drinking water source whereas areas mauka (toward the mountains) of the UIC line have underground sources of drinking water (HDOH SDWB 2023). Groundwater levels at each cable landfall were identified during site-specific geotechnical investigations; groundwater levels likely fluctuate due to seasonal precipitation, surface water runoff, tides, and other factors considering the proximity to the Pacific Ocean.

3.4.1.1 Kaua‘i Cable Landing Site

The Kaua‘i cable landfall at Nukoli‘i Beach Park is situated within the Kawailoa watershed, which encompass roughly 4 square miles and the CLS at KCC is located within the Puali watershed, which encompasses 2 square miles, respectively (CWRM 2019, CWRM 2022).

3.4.1.1.1 Surface Water

The only surface water feature within the Project Area for the Kaua‘i cable landing site is a small portion of a ditch which crosses under Kaua‘i Beach Drive via a culvert near the intersection with Kaua‘i Beach Road (Figure 8.1). The ditch continues along Kaua‘i Beach Road and appears to regularly carry surface water to nearby Kawailoa Stream, which is located just outside of the Project Area to the west and south of Kaua‘i Beach Road. Kawailoa Stream is identified as perennial by the USGS National Hydrography Dataset (NHD; USGS 2023) and the State of Hawai‘i Division of Aquatic Resources (DAR) dataset (DAR 2008); however, based on field observations, the surface water in Kawailoa Stream does not have a continuous surface connection to the ocean due to an elevated beach berm that prohibits surface flow between the stream and the ocean.

Additional surface waters are identified in the vicinity of the Kaua‘i cable landing by NHD, DAR, and the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) dataset (USFWS 2025), including a large freshwater emergent wetland immediately to the west of the above-referenced

[16] The top of the groundwater is normally at or near sea level outside of dike complexes. This is often referred to as “basal” groundwater. Groundwater can become trapped at high elevations within basalt formations due to the presence of near-impermeable, high-angle dike complexes. This type of groundwater is typically referred to as “high level” groundwater.

ditch, and wetlands and ponds to the south of Kauaʻi Beach Road near the shoreline.[17] No surface water features occur within the Project Area for the CLS at KCC.

3.4.1.1.2 Groundwater

The Kauaʻi cable landing site is located entirely in the Hanamāʻulu Aquifer System (CWRM Aquifer Code 20102). This system contains groundwater in basal, perched, and high level aquifers (CWRM 2019). The majority of reported groundwater use is from the perched aquifer followed by the basal aquifer, with little to no groundwater removed from the high level aquifer. Groundwater near the upper elevations of the aquifer (e.g., under the CLS) is mauka (inland) of the UIC line and is classified as a drinking water source, whereas groundwater resources at lower elevations (e.g., under the cable landfall) is makai of the UIC line and is not a drinking water source (HDOH SDWB 2023).

A geotechnical boring conducted to support the HDD design encountered groundwater at depths of about 6 feet on the first day of drilling and 11 feet the next day, as measured below the existing ground surface; groundwater levels are expected to fluctuate with tidal and seasonal conditions (GeoLabs 2025a).

3.4.1.2 Oʻahu Cable Landing Site

The Oʻahu cable landfall at Barbers Point Beach Park is situated within the Kaloʻi watershed, which encompasses roughly 26 square miles (CWRM 2019, CWRM 2022).

3.4.1.2.1 Surface Water

No onshore surface water features occur within the Project Area for this cable landing site. A drainage canal is present roughly 15 feet east of and parallel to the eastern boundary of the Project Area. This canal receives input from the drainage system located to the north within the Campbell Industrial Park.

3.4.1.2.2 Groundwater

The Oʻahu cable landfall is located in the ʻEwa Caprock – Malakole Aquifer Sector (CWRM Aquifer Code 30207). This system contains caprock groundwater and has been declared a non-potable aquifer by CWRM; this brackish resource mainly supports irrigation and industrial uses (CWRM 2019). Groundwater underlying the cable landfall is makai of the UIC line and is not a drinking water source (HDOH SDWB 2023).

A geotechnical investigation conducted within Barbers Point Beach Park to support the HDD design for the OSCT Project encountered static water at a depth of 2.3 feet below the existing ground surface (ICF 2025).

[17] NHD also identifies a canal/ditch and NWI identifies a riverine feature crossing through the western side of Kauaʻi Beach Drive. However, no stream or ditch was seen within this area during the field surveys, and the feature appears to be an agricultural dirt road.

3.4.1.3 Maui Cable Landing Site

The Maui cable landing site is within the ʻĪao watershed, which encompasses roughly 22 square miles (CWRM 2019, CWRM 2022).

3.4.1.3.1 Surface Water

No onshore surface water features occur within the Project Area for the Maui cable landing site. NHD maps a freshwater lake/pond near Kahului Harbor's western breakwater (USGS 2023). However, no evidence of a lake/pond or wetland was documented during the field survey.

3.4.1.3.2 Groundwater

The Maui cable landing site is located entirely in the Kahului Aquifer System (CWRM Aquifer Code 60301). This system includes groundwater in basal and caprock aquifers (CWRM 2019). The majority of reported groundwater use is from the basal aquifer. Groundwater underlying the cable landing site is makai of the UIC line and is not a drinking water source (HDOH SDWB 2023).

A geotechnical investigation conducted to support the HDD design encountered groundwater at depths of about 17 feet (at the completion of drilling) and 23 feet (overnight reading) below the existing ground surface; levels are expected to fluctuate with tidal and seasonal conditions given proximity to the harbor (GeoLabs 2025b).

3.4.1.4 Molokai Cable Landing Site

The Molokai cable landing site is situated within the Kaunakakai Gulch watershed, which encompasses roughly 19.7 square miles (Parham et al. 2008).

3.4.1.4.1 Surface Water

Approximately 0.15 acres of wetlands were delineated along the southwestern edge of the Project Area for the Molokai cable landfall (Figure 8.2); this includes 0.04 acres of an estuarine, intertidal wetland (Wetland 1) and 0.11 acres of a palustrine, emergent (Wetland 2). Under the current regulatory regime and definition of Waters of the U.S., these wetlands may be considered jurisdictional, and therefore subject to authorization by USACE if dredged or fill material is placed within their boundaries. The disturbed area that directly abuts Wetland 2 exhibited some wetland indicators; however, based on aerial imagery and field observations, this area is assumed to have similar conditions to the adjacent non-wetland sampling points (unvegetated; no saturation or inundation) in the absence of human alteration. No surface water features occur within the Project Area for the CLS at Molokai Education Center.

3.4.1.4.2 Groundwater

The Molokai cable landing site is located entirely in the Kamiloloa Aquifer System (CWRM Aquifer Code 40301). This system contains basal groundwater, with a small area of high level groundwater near the crest of the mountains (CWRM 2019). All reported groundwater usage is from the basal aquifer. The cable landing site is located makai of the UIC line and is not considered a drinking water source (HDOH SDWB 2023).

Based on a geotechnical investigation conducted to support the Project design, groundwater was encountered at a depth of approximately 3.5 feet (at the completion of drilling) below the existing ground surface near the proposed BMH, and at approximately 3.3 feet (at the completion of drilling) below the existing ground surface near the proposed CLS; groundwater levels are expected to fluctuate with tidal and seasonal conditions (GeoLabs 2025c).

3.4.1.5 Lānaʻi Cable Landing Site

The Lānaʻi cable landfall is situated within the Mānele watershed, which encompasses roughly 3.7 square miles (CWRM 2019, CWRM 2022).

3.4.1.5.1 Surface Water

No onshore surface water features occur within the Project Area for this cable landfall. The closest surface waters identified in the vicinity by NWI include a freshwater pond roughly 100 feet to the north and a riverine feature through the harbor parking lot roughly 360 feet to the north (USFWS 2025).

3.4.1.5.2 Groundwater

The cable landfall site is located in the Mānele Aquifer System (CWRM Aquifer Code 50402). This system contains brackish groundwater (CWRM 2019). Groundwater underlying the cable landfall is located makai of the UIC line and is not a drinking water source (HDOH SDWB 2023).

A geotechnical investigation conducted to support the HDD design encountered groundwater at depths of about 16.6 feet (during drilling) and 18.5 feet (overnight reading) below the existing ground surface; groundwater levels are expected to fluctuate with tidal and seasonal conditions (GeoLabs 2025d).

3.4.1.6 Hawaiʻi Island Cable Landing Site

The Hawaiʻi Island cable landing site is situated within the Wailoa watershed, which encompasses roughly 178 square miles (CWRM 2019, CWRM 2022).

3.4.1.6.1 Surface Water

There are no wetlands or streams (either perennial or intermittent) within the Project Area for the Hawaiʻi Island cable landing site. NHD (USGS 2023) identifies two waterbodies (classified as reservoirs) within the PACRC; these circular features are PACRC's aquaculture tanks.

3.4.1.6.2 Groundwater

The Hawaiʻi Island cable landing site is located entirely in the Hilo Aquifer System (CWRM Aquifer Code 80401). This system contains groundwater within basal, perched, and high level aquifers (CWRM 2019). The majority of reported groundwater use is from the basal aquifer, followed by the perched aquifer, with the least amount removed from the high level aquifer. Groundwater underlying the cable landing site is makai of the UIC line and is not a drinking water source (HDOH SDWB 2023).

A geotechnical investigation conducted to support the HDD design did not identify a groundwater level at this site; groundwater levels are expected to fluctuate with tides and seasonal conditions (GeoLabs 2025e).

3.4.2 Potential Impacts and Mitigation Measures

As further discussed below, the Project has been sited and designed to avoid direct impacts to onshore surface water features. However, Project-related construction activities have the potential to adversely affect onshore water quality through the release and/or transfer of pollutants to groundwater and/or nearby surface water features. BMPs would be implemented to avoid and minimize these impacts such that the Project would not be expected to result in significant adverse effects to either surface water or groundwater. The potential Project-related impacts and the associated impact avoidance and minimization measures are discussed in detail below.

3.4.2.1 Surface Water

Only the Kauaʻi and Molokai cable landing sites contain onshore surface waters and the Project has been designed to entirely avoid these features. None of the site preparation, material stockpiling, excavation and grading, trenching, Project component installation, or other surface disturbing activities would occur within onshore surface waters. On Kauaʻi, the terrestrial cable along Kauaʻi Beach Drive would be installed in conduit placed within the roadway of the existing concrete bridge over the ditch; thus, no direct impacts to the ditch are anticipated. On Molokai, no surface disturbance would occur within the delineated wetlands near the Molokai Yacht Club; appropriate BMPs (e.g., fencing, signage) would be installed to ensure no fill or other materials are accidentally placed into the wetlands during construction. A portion of the HDD conduit would be installed under the wetlands at an approximate depth of 30 to 40 feet below the ground surface. While HDD is a proven method to avoid impacts to surface resources, there is a low potential for accidental release of drilling fluid into the environment. As described in Section 2.5.4, this risk would be minimized and mitigated through implementation of specific measures detailed in the IDFR Contingency Plan (Appendix D). With implementation of these measures, no direct impacts to onshore surface waters are anticipated as a result of the Project.

Indirect impacts to onshore surface waters can result from discharge of pollutants, increased stormwater runoff, and modification of drainage patterns. Ground disturbance associated with Project construction could temporarily increase the potential for erosion and sediment discharge and other pollutants (e.g., diesel fuel, gasoline, lubricant oils, or hydraulic fluids) in stormwater runoff, which could affect water quality in downstream waters. As part of the permitting process, the Project would obtain Clean Water Act Section 401 Water Quality Certification (WQC). In addition, prior to construction, a SWPPP would be prepared as part of the application for Notice of General Permit Coverage for construction-related stormwater runoff, pursuant to National Pollutant Discharge Elimination System (NPDES) regulations, and site-specific erosion and sediment control plans would be prepared in accordance with applicable county regulations, as required. Through these regulatory processes, specific BMPs would be incorporated into the Project – including erosion prevention, sediment control, and good housekeeping measures – to prevent and minimize discharge of sediment and other pollutants to downstream waters; in general, these are expected to include measures such

as those listed below. Applicable BMPs would be installed prior to construction and inspected on a regular basis, with documentation of the inspection results and implementation of necessary corrective actions. Implementation of these measures would minimize the potential for discharge of sediment and other pollutants in stormwater runoff, such that significant water quality impacts to downstream waters are not anticipated.

- No ground disturbance would occur until all applicable BMPs are in place. The construction work area would be properly delineated, with all ground disturbing activities occurring within the construction work area.
- The extent of ground disturbance would be kept to the minimum necessary. Construction activities would be sequenced in a manner that reduces the amount and duration of exposed soils at any given time.
- Perimeter controls, such as silt fence or sediment barriers (e.g., sandbags, fiber rolls, compost filter socks), would be installed along the perimeter of the Project Area that could receive stormwater from areas subject to ground disturbance. All control measures would be checked and repaired as necessary, particularly following periods of rainfall.
- Construction activities involving movement or disturbance of soil would not occur during heavy rain events.
- Any stockpiles would be located at a reasonable distance from the shoreline or any drainage areas. Stockpiles or erodible materials would be contained by perimeter controls (e.g., silt fence or sediment barrier) and properly covered when not in use.
- Heavy equipment would be inspected at the beginning of each workday for cleanliness and leaks. Should a leak be detected, equipment would not be used until the leak has been repaired and the equipment is cleaned.
- Good housekeeping measures would be utilized to ensure protection of adjacent roadways from mud, dirt, and debris.
- A waste collection area would be designated within the Project Area. Waste would be promptly collected for disposal at an approved offsite location.
- Onsite storage of hazardous materials would be minimized; if onsite storage of hazardous materials is necessary, they would be properly stored in a designated area with secondary containment.
- Proper use and waste disposal methods would be used for all hazardous materials. All leaks and spills would be promptly cleaned up.
- Any temporarily disturbed areas would be backfilled or graded to match surrounding grade and vegetated or otherwise stabilized based on pre-existing conditions.
- All temporary erosion control measures and other BMPs would be removed from the site and properly disposed of at the end of the construction period.

Although portions of the cable landing sites would be cleared and altered during construction, all temporarily disturbed areas would be returned to their pre-existing condition following construction. As a result, long-term impacts on drainage patterns are expected to be negligible. The Project infrastructure would result in a minor increase in new impervious surfaces associated with the BMH manhole cover at each cable landfall and new CLS structures on Maui, Molokai, and Hawai'i Island (and a new generator pad for the Kaua'i CLS); however, the additional impervious surfaces at each cable landing site would be relatively small (less than 1,000 square feet per site) and would not result in a notable increase in stormwater runoff, with sufficient areas for infiltration remaining in the immediate vicinity. As such, it is expected that indirect effects of the Project to onshore surface waters would be negligible.

3.4.2.2 Groundwater

Construction and operation of the Project would not impact groundwater supply or recharge. The Project would require freshwater for HDD drilling and other construction activities at each cable landing site. This water would be obtained via each county's existing water supply, such that it would not deplete any groundwater sources or interfere with groundwater availability. As described above, the CLS facilities would add new impervious surface to some cable landing sites (e.g., Kaua'i, Maui, Molokai, and Hawai'i Island); however, the additional impervious surface at each site would be minimal (no more than 1,000 square feet) and would have a negligible effect on groundwater recharge. As the Project would require excavation and trenching in areas with shallow groundwater, especially near the shoreline, construction activities could intercept groundwater at each of the cable landing sites. Given the close proximity of the cable landing sites to the ocean, groundwater encountered during Project construction is expected to be saline/brackish; the Project would not interact with any groundwater used as a drinking water source. Furthermore, as discussed below, appropriate measures would be implemented such that any construction-related impacts to groundwater quality would be temporary, localized, and minor.

Construction of the onshore facilities would involve excavation and trenching to depths (expressed in feet below ground level) of approximately 12 feet for the BMH, 6 feet for the HDD return pit, 4 feet for the terrestrial cable conduit, and 7 feet for the CLS foundations. In portions of the Project Area with shallow groundwater, such as O'ahu and Molokai, groundwater is likely to be encountered during excavation and trenching activities. In accordance with federal and state requirements, the Project would implement a site-specific dewatering plan with BMPs to protect groundwater quality and would obtain NPDES permit coverage for discharge of dewatering effluent as needed. Construction activities would also require the use of some hazardous materials, such as fuel (e.g., gasoline and diesel fuel) and lubricants, which could adversely affect groundwater quality if accidentally released. However, only a limited amount of these materials would be present onsite and BMPs would be implemented to avoid and minimize potential impacts. As detailed in the preceding section, BMPs would include proper storage procedures (including secondary containment), routine inspection of vehicles and equipment for leaks, and proper waste collection and disposal methods.

As the HDD conduit would traverse under the shoreline, HDD drilling is expected to intercept groundwater at all cable landfalls. Routine HDD drilling would not be expected to impact groundwater

quality. Although occurrences are rare, potential groundwater quality impacts could occur as a result of inadvertent release of drilling fluid (see Section 2.5.4 for more information on IDFR). While the products used for drilling (e.g., bentonite) are naturally occurring, non-toxic, and meet NSF International and American National Standards Institute (ANSI) standards for drinking water, the fine particles could impact groundwater quality (specifically total suspended solids [TSS], total dissolved solids [TDS], and turbidity) if significant amounts were to be released. The potential for an inadvertent release would be minimized through implementation of an IDFR Contingency Plan (Appendix D). Furthermore, all Project-related HDD activities would be located at the coastal margin, which is hydraulically down-gradient of inland potable groundwater resources; groundwater flow in these margins is directed seaward and the prevailing hydraulic head would restrict any potential particulate migration to up-gradient potable groundwater. As such, in the unlikely event of a potential disturbance or IDFR, impacts to groundwater would be temporary, localized, and minor. At the completion of drilling, all drilling fluid and any solid materials displaced as a result of the HDD activities would be removed from the Project Area and disposed of at an approved upland location.

3.5 Marine Water Quality

3.5.1 Affected Environment

As required by Section 303 of the Clean Water Act, the HDOH has established water quality standards for waters across the state. These standards, which are detailed in HAR Section 11-54, designate beneficial uses, establish water quality criteria, and specify requirements for protection and maintenance of healthy waters. Water bodies that do not achieve the criteria are designated as "impaired" and are placed on the Clean Water Act Section 303(d) List of Impaired Waters; for each water body on the Section 303(d) list, a Total Maximum Daily Load (TMDL) must be developed to bring that water body into compliance with water quality standards. Monitoring is routinely conducted and reported by HDOH; the most recent monitoring results are contained in the 2024 State of Hawai‘i Water Quality Monitoring and Assessment Report (HDOH CWB 2024).

HAR Section 11-54-3(c) classifies marine waters as Class A or Class AA. The objective of Class A waters is to protect their use for recreational purposes and aesthetic enjoyment; uses are permitted as long as they are compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters. Class A waters are not intended to receive any discharge which has not received the best degree of treatment or control compatible with the criteria established for this class. Class AA waters are intended to remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from human-caused source or actions to protect uses including oceanographic research, the support and propagation of shellfish and other marine life, conservation of coral reefs and wilderness areas, compatible recreation, and aesthetic enjoyment, and other uses compatible with the applicable criteria. Water quality criteria specified in HAR Section 11-54-6 for marine waters include total nitrogen (TN), nitrate + nitrite nitrogen (NO_3 + NO_2), ammonia nitrogen (NH_4), total phosphorus, chlorophyll a, and turbidity.

Table 3-4 identifies the nearest monitoring station and applicable water body classification, with a summary of the most current water quality monitoring results for each cable landfall.

Table 3-4. HDOH Water Quality Monitoring Results

Cable Landing Site	Nearest Monitoring Location[1/]	Water Body Type	Water Body Classification	Monitoring Results
Kaua'i	Nukoli'i Beach (Kawailoa Nearshore)	Open coastal	Class A Water	In attainment for all criteria except NH_4 and turbidity; also indicates trash as other parameter (TMDL needed; low priority)
O'ahu	Barbers Point (Kaloi Nearshore)	Open coastal	Class A Water	In attainment for all criteria except turbidity and chlorophyll a (TMDL needed; low priority)
Maui	Kahului Bay	Embayment	Class A Water	Non-attainment for $NO_3 + NO_2$ (TMDL needed; low priority); attainment of other criteria or insufficient data to evaluate
Molokai	Kaunakakai Harbor	Embayment	Class A Water	Not enough data to evaluate
Lāna'i	Mānele Bay Boat Harbor	Embayment	Class AA Water	In attainment for all criteria except turbidity and chlorophyll a (TMDL needed; low priority)
Hawai'i Island	Puhi Bay	Open coastal	Class A Water	In attainment for all criteria except $NO_3 + NO_2$ (TMDL needed; low priority)

1/ For sites with insufficient data for evaluation, the relevant assessment unit is indicated in parentheses with corresponding results provided.

3.5.2 Potential Impacts and Mitigation Measures

Construction of the onshore Project components, HDD drilling, and submarine cable laying could potentially affect marine water quality through the release and/or transfer of pollutants to the marine environment. However, as further discussed below, BMPs would be implemented to avoid and minimize these impacts such that the Project would not be expected to cause an exceedance of any water quality criteria or otherwise result in significant impacts to marine waters. As further discussed in Section 5.1.2.2, Clean Water Act Section 401 WQC would be obtained prior to construction, thereby affirming compliance with all applicable water quality standards.

3.5.2.1 Onshore Construction

As detailed in Section 2.5, onshore construction would involve site preparation, material stockpiling, excavation and grading, trenching, and other ground disturbing activities. All ground-disturbing activities would occur well above the high tide line, such that there would be no direct impacts to the marine environment. Indirect impacts to marine water quality could result if sediment or other pollutants associated with construction were to be conveyed through stormwater runoff. In particular, the Project could result in increased turbidity of nearshore waters due to increased sediment exposed by ground-disturbing activities. Similarly, marine water quality could be indirectly affected due to accidental release (e.g., a spill or leak) of hazardous materials such as diesel fuel, gasoline, lubricant oils, hydraulic fluids, or other chemicals required for the operation of construction vehicles and equipment.

Overall, the extent of ground disturbance at each cable landfall would be minimized to the extent practicable, with all ground disturbing activities occurring a minimum of 100 feet from the shoreline. BMPs would be implemented to further avoid and minimize potential impacts to water quality. As detailed in Section 3.4.2, BMPs would address erosion prevention, sediment control, and good housekeeping and are expected to include, but are not limited to, installing and maintaining perimeter controls (e.g., silt fence or sediment barriers), avoiding earthwork during adverse weather conditions, and proper storage and disposal of all hazardous materials. Specific measures would be

identified as part of a SWPPP and site-specific erosion control plans, which would be developed and implemented in accordance with applicable federal, state, and local regulatory requirements. With implementation of these measures, onshore construction activities are not expected to adversely affect marine water quality.

Following construction, all of the cable landfall infrastructure would be below ground, with only the BMH covers at grade. All other surfaces would be revegetated as needed and returned to their pre-existing condition. The CLS facilities would add new impervious surface to certain cable landing sites (e.g., Kauaʻi, Maui, Molokai, and Hawaiʻi Island); however, as previously discussed, the additional impervious surface at each site would be minimal and the Project would adhere to all applicable stormwater regulations. As such, onshore construction activities would not be expected to affect marine water quality.

3.5.2.2 HDD

As described in Section 2.3.2, HDD was selected for use on this Project specifically to avoid impacts to the shoreline and nearshore environment through installation of an underground conduit to accommodate the subsea cable landfall. HDD is an industry standard methodology and results in minimal impacts when properly designed and executed by an experienced contractor using industry-approved equipment and materials. Although occurrences are rare, impacts to the surrounding environment can occur during HDD activities as a result of IDFR. As described in Section 2.5.4, drilling fluid used for HDD consists of a thixotropic mud (such as bentonite, a naturally occurring clay), mixed with water. While bentonite is non-toxic and meets applicable drinking water standards, the fine particles could potentially impact water quality (specifically TSS, TDS, and turbidity) if large amounts are released to the marine environment.

Potential impacts associated with an IDFR are readily avoided and minimized through detailed planning, monitoring, and contingency response plans. As part of the design and engineering process, detailed geotechnical studies were conducted to confirm the suitability of the substrate for drilling at each cable landing site. Furthermore, the drilling profiles have been designed to ensure appropriate depths based on the site-specific substrate. As described in Section 2.5.4 and detailed in Appendix D, an IDFR Contingency Plan has been developed; the purpose of the plan is to specify the pre-drilling preparations, monitoring requirements during drilling, and stop work, containment, and recovery procedures in the event of a release. The plan would be finalized prior to construction, and the measures detailed in the plan would be implemented throughout the duration of HDD activities. At the completion of drilling, all drilling fluid and any solid materials displaced as a result of the HDD activities would be removed from the Project Area and disposed of at an approved upland location.

Completion of each HDD borehole would involve minor disturbance of the seabed floor at the designated punchout point, which could temporarily increase turbidity. However, the HDD drill pipe would be relatively small (e.g., approximately 6 inches in diameter) with the overall area of disturbance expected to be less than 10 feet by 10 feet. Furthermore, the drilling fluid used for HDD operations would be replaced with freshwater for the final segment of the borehole to minimize the potential for release of any drilling fluid to the marine environment. As such, HDD-related impacts are

expected to be limited to temporary and localized increases in turbidity, with negligible effects compared to natural sediment movement in the marine environment.

Given the benefits of HDD to allow the subsea cable to traverse under the shoreline with minimal seabed disturbance, and with implementation of an IDFR Contingency Plan and other related BMPs, the potential impacts of HDD activities on marine water quality are expected to be temporary and minor.

3.5.2.3 Submarine Cable

As detailed in Section 2.5.6, the subsea cable would be installed once the HDD conduit is in place; the cable would be pulled through the HDD conduit then surface-laid on the seabed, with no trenching or burial. Cable pulling and placement on the seabed could temporarily increase turbidity due to disturbance of bottom sediments, especially in the vicinity of the HDD punchout if sand jetting is needed to ensure a clear opening of the conduit prior to cable pulling. However, any impacts associated with increased sediment movement would occur over a short period of time and would be very localized, given the cable's minimal size. Any impacts are expected to be negligible compared to natural sediment movement in the marine environment.

Based on evidence from subsea cable systems in similar substrates, it is anticipated that the cable would self-bury in areas of soft sediment and portions of the cable that traverse hard bottom may be colonized by coral. As discussed in Section 2.3.1, subsea fiber optic cables are composed of optical fibers (which function by transmitting light) wrapped with a combination of ultra-high strength steel wires, polyethylene and nylon yarn (for protection), all enclosed in an outer HDPE layer. These materials are chemically inert, environmentally stable, and are specifically used for subsea cables as they are non-corrosive and do not leach chemicals into the surrounding environment. As the cable would conform to the seabed floor and would not contain materials that would be harmful to water quality, no long-term marine water quality impacts are anticipated.

3.6 Marine and Nearshore Biological Resources

To inform routing and refinement of the subsea cable route, existing bathymetric survey datasets were analyzed to assess bottom substrate types, slopes, and bathymetry, and to identify potential habitats where corals and other sensitive resources may be present. These existing data were supplemented with Project-specific geophysical data collected using a vessel-towed MBES. MBES surveys were conducted at each cable landing site out to water depths of approximately 328 feet, with a survey corridor width ranging between 200 feet and 800 feet wide (based on site-specific constraints and water depths). These Project-specific data were analyzed and classified based on substrate type to support identification of a cable route that avoids nearshore and offshore hard bottom substrates to the extent feasible. Subsequently, dive surveys were conducted within the nearshore waters at each cable landfall to verify the benthic habitats present and characterize the fish communities and invertebrate assemblages; these surveys focused on the proposed HDD punchout points and nearshore cable route (out to safe diving limits). The dive survey results were used to determine the appropriate Coastal and Marine Ecological Classification Standard (CMECS) along the cable route to approximately 100-foot water depths, as well as to inform detailed cable routing and micrositing to

further minimize potential impacts to marine biological resources. A summary of the marine resources within the Project Area is provided below, with a focus on the nearshore waters associated with each cable landing site; copies of the marine biota survey reports are contained in Appendix F. Figures showing the proposed cable route centerline for each cable landing site along with interpreted bathymetric information and CMECS classifications are shown in Figures 9.1 to 9.6.

3.6.1 Affected Environment

The marine environments vary widely among islands, from sparsely populated sand and rock substrates to coral reef systems and seagrass beds. Fish and invertebrate communities generally reflect the underlying habitat diversity, with some areas supporting abundant coral-associated fauna and others characterized by sparse macrobiota. Based on the Project-specific dive survey data, MBES geophysical survey data, and existing bathymetric data for offshore areas, soft-bottom substrates are the predominant habitat type across the entirety of the cable route. These areas generally have lower biological complexity compared to hardbottom substrates. A limited amount of the following habitats are also present in certain locations along the cable route:

- **Seagrass Beds:** These submerged aquatic vegetation areas, such as beds of *Halophila* spp., provide important nursery and foraging habitat for many fish and invertebrate species, and are a source of food for sea turtles.
- **Macroalgal Communities:** Turf and macroalgae are commonly found on hard substrates, including reef flats and limestone pavements. These algal communities serve as a food source for herbivorous fish, invertebrates, and sea turtles.
- **Rocky and Hardbottom Substrates:** Areas of hardbottom, including limestone fossil reefs and basaltic rock formations, provide substrate for sessile organisms such as sponges, corals, and anemones, and offer refuge and feeding grounds for marine species.

Between the various cable landing sites, the cable route passes through deep interisland channels. Based on the existing bathymetric data, these areas generally comprise soft-bottom substrates; however, there is limited information regarding specific benthos in these areas. The cable has been preferentially routed to avoid steep slopes, cross slopes, pinnacles, and rocky outcrops to the extent practicable, thus avoiding habitat that may be suitable for deep-sea corals that occur on hard bottom.

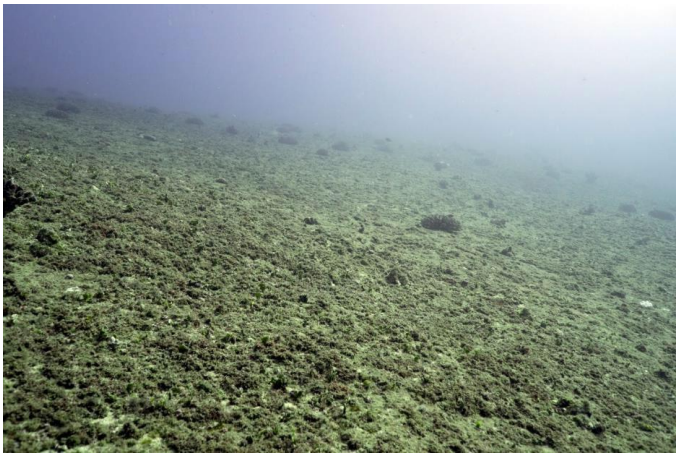
As part of the terrestrial biological resource surveys, biologists also incidentally documented marine invertebrates along the shoreline at each cable landing site (see Appendix G). These included various species of crabs, gastropods, and sea urchins commonly found in rocky intertidal zones and sandy shorelines. Endemic marine gastropod snails (limpets), known in Hawai‘i as ‘opihi (*Cellana* sp.), were recorded along the shoreline at the Maui, Lāna‘i, and Hawai‘i Island cable landing sites; ‘opihi may occur within any rocky intertidal and tidepool habitats within the Project Area as these species graze on microalgae and biofilms growing on rocks. Additionally, the indigenous speckled periwinkle/ pūpū kolea (*Littoraria pintado*) and shingle urchin/ hā'uke'uke (*Colobocentrotus atratus*) were observed along the shoreline at the Maui cable landing site and may also occur in rocky intertidal areas throughout the Project Area. Various crab species could also occur within the shoreline areas; indigenous ‘a‘ama crabs (*Grapsus tenuicrustatus*), horned ghost crab/ ‘ōhiki (*Ocypode*

ceratophthalma), and mangrove crabs (*Scylla serrata*) were recorded during the intertidal observations.

3.6.1.1 Kauaʻi Cable Landing Site

Dive surveys indicate the coastal marine environment near the proposed HDD punchout point and surface-laid cable route for the Kauaʻi cable landing site consists primarily of flat, gently sloping limestone pavement with low rugosity, likely a relic terrace from lower sea levels. Apart from turf algae and various macroalgae, biological communities are limited. One exception is an overhanging ledge, about 4,265 feet from shore in approximately 65- to 80-foot water depths, which hosts colonies of black coral/ ʻekaha kū moana (*Antipathes* sp.) and schools of several fish species. The black coral colonies are smaller than harvestable size and are not included in any mapped essential fish habitat (EFH) precious coral beds. Other live corals in this area are scarce, covering less than 3 percent of the seafloor. Fish observed included bluestrip snapper/ taʻape (*Lutjanus kasmira*), giant trevally/ ulua (*Caranx ignobilis*), manybar goatfish/ moano (*Parupeneus multifaciatus*), and surgeonfishes (Acanthuridae); macroinvertebrates included sea stars/ peʻa (Asteroidea) and black sea cucumber/ loli (*Holothuria atra*).

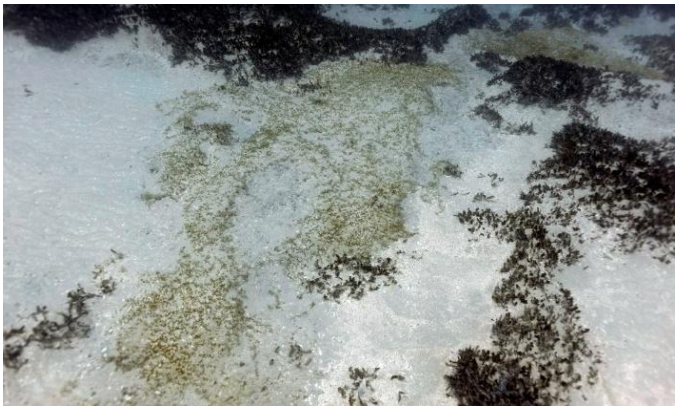
Based on the results of the dive surveys, the HDD punchout point has been sited beyond the overhanging ledge to avoid impacting any black coral (Figure 9.1). Sparse colonies of branching cauliflower coral/ koʻa (*Pocillopora meandrina*) were observed near the punchout point and surface-laid cable route, up to 30 feet seaward of diving depths. No seagrass beds were observed and other invertebrates were limited to a few echinoderms such as sea stars. Further details are provided in the marine biota survey report for this site (Appendix F).



Characteristic marine benthic habitat along HDD alignment

3.6.1.2 O‘ahu Cable Landing Site

Dive surveys indicate the benthic habitat composition at the proposed HDD punchout points for the O‘ahu cable landing site is sandy substrate without any corals or seagrass (Figure 9.2). Macroalgae and seagrass (*Halophila* sp.) occur along the proposed surface-laid cable routes extending offshore from the punchout points to water depths of approximately 85 to 100 feet. No coral colonies were observed within a 50-foot radius of the punchout points, and few were observed in the vicinity of the cable routes (<1 percent bottom cover). Fish observed included wrasses (Labridae), surgeonfishes (Acanthuridae), and butterflyfishes/ kīkākapu (Chaetodontidae). Abundant species observed include Hawaiian whitespotted toby (*Canthigaster jactator*), arceye hawkfish (*Paracirrhites arcatus*), blackfin chromis (*Pycnochromis vanderbilti*), and saddle wrasse/ hīnālea lauwili (*Thalassoma duperrey*). Further details are provided in the marine biota survey report for this site (Appendix F).



Characteristic marine benthic habitat along cable route

3.6.1.3 Maui Cable Landing Site

Dive surveys conducted for the Maui cable landing site indicate the marine environment near the proposed HDD punchout points and cable routes out to approximately 100-foot water depths consists nearly exclusively of sand beds without channels or other major habitat features (Figure 9.3). Overall, macrobiota was extremely sparse in the surveyed area; no corals or seagrass were observed. In some areas (adjacent to and away from the proposed cable routes), the sand-covered seafloor included occasional rocks, rubble, and some hard substrate overgrown with turf algae and macroalgae, but no corals were present. Similarly, very few macroinvertebrates and fish were documented, except for a transient school of juvenile bluefin trevally/ ulua (*Caranx melampygus*). Further details are provided in the marine biota survey report (Appendix F).



Characteristic marine benthic habitat along cable route

3.6.1.4 Molokai Cable Landing Site

The coastal marine environment near the proposed HDD punchout point and surface-laid cable route for the Molokai cable landing site consists of a blend of soft sediments, reef flats, walls, rubble, and pavement reefs with sand veneer and sparse coral cover. Extremely high turbidity hampered visibility during the dive surveys at this site. Such chronic turbidity along the reef flat of southern Molokai has

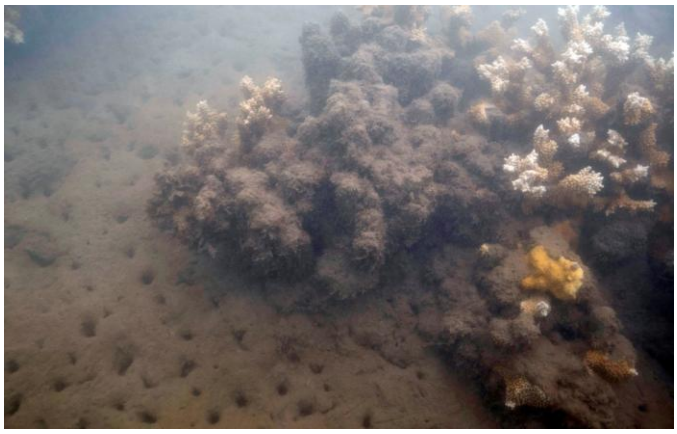
been documented to persist due to daily tradewinds and tides resuspending terrestrial sediment, thereby limiting coral growth; the Kaunakakai wharf further restricts longshore transport that could help remove the sediment (Piniak and Storlazzi 2008; Jokiel et al. 2004).

Dive surveys conducted for the Molokai cable landing site indicate the proposed HDD punchout point is in an area comprising sand and fine sediment, with a few scattered patches of hard substrate harboring few small colonies of crust coral (*Leptastrea purpurea*). Seagrass (*Halophila* sp.), with approximately 20 to 40 percent cover, was documented in the vicinity of the HDD punchout and along the cable route to the edge of the dredged harbor basin. Due to the timing of these surveys, this cover seagrass was likely near the maximum seasonal extent.



Characteristic marine benthic habitat at HDD punchout

Within the dredged footprint of the harbor basin, the proposed cable route would be located along the far western edge of the harbor basin floor (Figure 9.4). The dive surveys indicate this area comprises mostly soft sediments with numerous holes from burrowing infauna. Seagrass was rare in this area, with only two thin patches observed during one survey. Despite the high turbidity, the adjacent harbor channel wall along the western edge of the dredged basin has been heavily colonized by a few species of corals (rice coral [*Montipora capitata*], ringed rice coral [*Montipora patula*], lace coral [*Pocillopora damicornis*], finger coral [*Porites compressa*], and lobe coral [*Porites lobata*]). A few portions along the harbor wall, primarily consisting of fallen coral rubble, intermittently encroach onto the dredged harbor basin floor. The outer harbor comprises pavement, lightly covered by sand, with very few sporadic coral heads and no seagrass observed.



Characteristic habitat adjacent to harbor channel wall

Fish observed included Hawaiian whitespotted toby, bluestripe snapper, and wrasses. Macroinvertebrates observed included long-spined urchin/ wana (*Diadema paucispinum*), blue-lined long-spined urchin/ wana (*Diadema savignyi*), sea stars, and edible sea cucumber/ loli (*Holothuria edulis*). Further details are provided in the marine biota field survey report (Appendix F).

3.6.1.5 Lānaʻi Cable Landing Site

The subsea cable for the Lānaʻi cable landing site would traverse the Mānele-Hulopoʻe Marine Life Conservation District (MLCD). Dive surveys indicate the nearshore marine environment at the proposed HDD punchout point and cable route to approximately 100-foot water depths consists entirely of sand (Figure 9.5). No corals, seagrass, or other sensitive biota were observed. Sparsely distributed patches of calcareous algae/ pūkoʻakoʻa (*Halimeda* spp.) were observed, with occurrence increasing slightly with depth. Observed fish and macroinvertebrates included wrasses, and collector urchins/ hāwaʻe (*Tripneustes gratilla*), but both were sparse. Further details are provided in the marine biota survey report for this site (Appendix F).



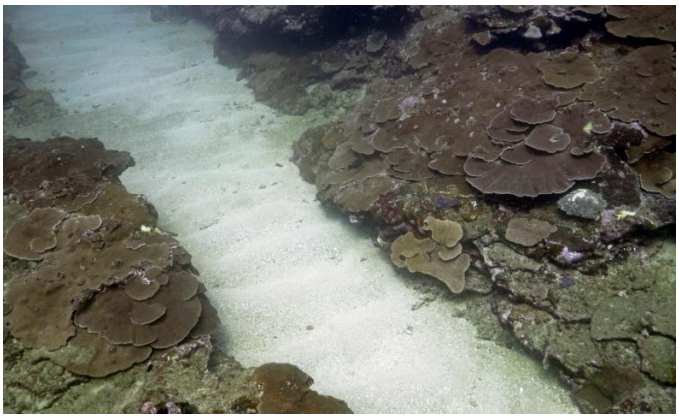
Characteristic marine benthic habitat along cable route

3.6.1.6 Hawaiʻi Island Cable Landing Site

Dive surveys for the Hawaiʻi Island cable landing site indicate the HDD punchout point is in an area comprised entirely of silty sand; no corals, epibenthic non-coral invertebrates, macroalgae, or seagrass were observed. Offshore of the HDD punchout, the surface-laid cable route extends through a series of elongated reef mounds covered with coral and macroalgae, and interspersed with sand-filled channels largely devoid of macrobiotic epifauna out to approximately 85-foot water depths (Figure 9.6). Where reef is present, coral cover was estimated to range from 40 to 85 percent on average. Of the living corals documented, rice coral dominated, followed by finger coral (*Porites compressa*) and lobe coral (*Porites lobata*). Coral colonies generally increased in size with distance from shore, suggesting more mature reefs offshore and younger colonizing reefs inshore. Sea urchins (blue-lined long spine urchin, pale-rock boring urchin/ ʻina ʻula [*Echinometra mathaei*], and



Characteristic marine benthic habitat at the HDD punchout



Characteristic marine benthic habitat along cable route

slate pencil urchin/ hāʻueʻue [*Heterocentrotus mamillatus*]) were the dominant invertebrates. Dominant fish included surgeonfishes, triggerfish/ humuhumu (Balistidae), butterfly fishes, and bluefin trevally. Algae, dominated by red gelatinous macroalgae/ limu (*Predaea* sp.), covered limited areas of hard substrate along the cable route. No seagrass was observed during the surveys. As further discussed in Section 3.6.2.6.6, the cable would be preferentially laid within the sand-filled channels to the extent possible; where the cable passes over reefs and hard substrate, split pipe would be added around the cable and attached to the substrate to prevent movement from ocean swells. Further details are provided in the marine biota survey report for this site (Appendix F).

3.6.1.7 Protected Species

Marine species in Hawaiʻi are protected under a combination of federal and state laws and regulations. The federal Endangered Species Act (ESA; 16 USC § 1531 et seq.) prohibits take of any species that are listed as endangered or threatened, and provides protection for critical habitat that is designed for these species (see Section 5.1.3). Under the ESA, critical habitat is identified as essential for the conservation of the species and may include locations currently occupied by the species or areas necessary for their recovery (16 USC § 1533). In addition, all marine mammals are protected in U.S. waters under the federal Marine Mammal Protection Act (MMPA; 16 USC § 1361 et seq.); this act prohibits take (i.e. harassment, hunting, capturing, or killing) of marine mammals, except under specific circumstances and with proper authorization.

At the state level, HRS Chapter 195D parallels the federal ESA by providing for the conservation, protection, restoration, and propagation of state listed threatened and endangered species within the State of Hawaiʻi. HRS 195D prohibits the take, possession, sale, or transport of any state listed threatened or endangered species. Species listed by the state as threatened or endangered include those listed under the ESA, as well as additional species included in HAR Section 13-124, Exhibit 3.

The following sections summarize the protected marine species that could potentially occur within the Project Area. Table 3-5 lists ESA and state listed species, their regulatory status, critical habitat, and likelihood of occurrence in the Project Area.

Table 3-5. ESA and State Listed Marine Species With Potential to Occur in Project Area

Common Name	Scientific Name	Federal / State Status	Critical Habitat in Project Area	Likelihood of Occurrence
Fish				
Giant manta ray	*Mobula birostris*	FT / ST	No	Unlikely
Oceanic whitetip shark	*Carcharhinus longimanus*	FT / ST	No	Unlikely
Cetaceans				
Blue whale	*Balaenoptera musculus*	FE / SE	No	Rare
False killer whale, Main Hawaiian Islands Insular DPS	*Pseudorca crassidens*	FE / SE	Yes[1/]	Likely
Fin whale	*Balaenoptera physalus*	FE / SE	No	Unlikely
Humpback whale	*Megaptera novaeangliae*	— / SE	No	Likely
North Pacific right whale	*Eubalaena japonica*	FE / SE	No	Unlikely
Sei whale	*Balaenoptera borealis*	FE / SE	No	Unlikely

Common Name	Scientific Name	Federal / State Status	Critical Habitat in Project Area	Likelihood of Occurrence
Sperm whale	*Physeter macrocephalus*	FE / SE	No	Potential
Pinnipeds				
Hawaiian monk seal	*Neomonachus schauinslandi*	FE / SE	Yes[2/]	Likely
Sea Turtles				
Green sea turtle, Central North Pacific DPS	*Chelonia mydas*	FT / ST	Proposed[3/]	Likely
Hawksbill sea turtle	*Eretmochelys imbricata*	FE / SE	No	Likely
Leatherback sea turtle, West Pacific DPS	*Dermochelys coriacea*	FE / SE	No	Rare
Loggerhead sea turtle, North Pacific DPS	*Caretta caretta*	FE / SE	No	Rare
Olive ridley sea turtle	*Lepidochelys olivacea*	FT / ST	No	Rare

FT = listed as threatened under the ESA; FE = listed as endangered under the ESA; ST = listed as threatened under HRS Chapter 195D; SE = listed as endangered under HRS Chapter 195D; DPS = Distinct Population Segment
1/ Critical habitat includes marine waters around the main Hawaiian Islands from 148-foot to 10,500-foot depth contours (Figures 10 and 12; NOAA Fisheries 2022a).
2/ Critical habitat includes preferred pupping and nursing areas, haul-out sites, and marine foraging habitats extending seaward to the 656-foot depth contour and terrestrial areas extending 16 feet inland from the shoreline (Figures 10 and 12; NOAA Fisheries 2022b).
3/ Proposed critical habitat encompasses both marine habitats, which includes waters surrounding the islands from the mean high water line to 65-foot water depths, and terrestrial areas (Figures 11 and 12; NOAA Fisheries 2023a,b).

3.6.1.7.1 Fish

Two federally and state listed fish species have the potential to occur in the Project Area: giant manta ray (*Mobula birostris*) and oceanic whitetip shark (*Carcharhinus longimanus*).

Giant manta ray is a migratory pelagic species that occurs in offshore, nearshore, and reef-associated waters around the main Hawaiian Islands (MHI). They are often found in the upper surface waters during the day but can dive to depths up to approximately 1,417 feet at night, where they feed on zooplankton and other small marine crustaceans (Braun et al. 2014; Bigelow and Schroeder 1953; Rohner et al. 2017). Given the documented occurrences in Hawaiian waters, this species could occasionally occur within the Project Area.

Oceanic whitetip shark is a highly migratory pelagic shark with a global distribution in tropical and subtropical waters. It predominantly lives in the upper part of the water column in deep offshore waters. This species is considered to be rare in nearshore areas but may occasionally occur in offshore Hawaiian waters; although unlikely, it could potentially occur in the Project Area.

3.6.1.7.2 Marine Mammals

Marine mammals include cetaceans (whales and dolphins), comprising two suborders (Mysticeti [baleen whales] and Odontoceti [toothed whales]) as well as pinnipeds (seals). A diverse community of both baleen and tooth whales inhabit the Project Area (Barlow 2006; Baird et al. 2015; Bradford et al. 2017; Mobley et al. 1999, 2001). Distribution and habitat use vary by species and life stage, influenced primarily by prey availability, reproductive behavior (notably for humpback whales [*Megaptera novaeangliae*]), and human disturbances.

Baleen Whales

Baleen whales range from 15 to 90 feet and are filter feeders, using baleen plates to sieve prey. Many feed near the surface, making them vulnerable to vessel strikes. Federally and/or state listed and

MMPA-protected baleen whales that may occur in the Project Area include the humpback whale, minke whale (*Balaenoptera acutorostrata*), sei whale (*B. borealis*), blue whale (*B. musculus*), fin whale (*B. physalus*), and North Pacific right whale (*Eubalaena japonica*). Fin whale, blue whale, sei whale, and North Pacific right whale occur rarely as transients passing offshore or between islands (Barlow 2006; Bradford et al. 2017, 2022). Given their extensive migratory ranges and low likelihood of occurrence in the Project Area, these species are not discussed further herein.

The Hawaiian distinct population segment (DPS) of humpback whales, which are part of the Central North Pacific stock, are seasonally abundant throughout in the Project Area from approximately September through June (Frankel et al. 2022). Peak abundance occurs mid-February through early April, with the highest concentrations southwest of Molokai (Penguin Banks) and between Molokai, Maui, Kahoʻolawe, and Lānaʻi (Mobley et al., 1999). The Hawaiian DPS population is estimated at over 11,000 individuals (Young et al. 2024). Humpbacks prefer shallow waters (<200 yards) during breeding, particularly females with calves, who surface frequently and are vulnerable to boat strikes (Currie et al. 2017). The Hawaiian Islands Humpback Whale National Marine Sanctuary (Figure 13), established in 1992 and co-managed by NOAA Fisheries and DLNR, protects humpback whales and their habitat.

Three North Pacific stocks of minke whale exist; the MHI stock occurs seasonally throughout the archipelago (Cascadia 2023; NOAA Fisheries 2021a). While this species is rarely observed, it is primarily detected acoustically from October to May, peaking from January to March (Barlow 2006). Population estimates range from 200 to 500 animals. They may breed and calve in MHI waters (Cascadia 2023).

Toothed Whales

Several species of Odontocetes, including dolphins and other toothed whales, may occur in the Project Area. These include sperm whales (*Physeter macrocephalus*), the MHI DPS of false killer whales (*Pseudorca crassidens*), spinner dolphins (*Stenella longirostris*), bottlenose dolphins (*Tursiops truncatus*), and Pantropical spotted dolphins (*Stenella attenuata*).

Endangered sperm whales are widely distributed in deep offshore waters and routinely dive to depths up to 2,000 feet (NOAA Fisheries 2021b). The Hawaiʻi stock is estimated at approximately 5,707 individuals (Forney et al. 2015). Sperm whales occur year-round but are uncommon in shallow waters; this species is most likely to occur in deeper waters within the Project Area.

The endangered false killer whale is a fast-moving delphinid with three Hawaiian stocks: the Northwestern Hawaiian Islands (NWHI) population, the pelagic population, and the MHI insular population. This DPS is considered to be resident and could potentially occur in the Project Area. The MHI stock has declined to fewer than 150 to 70 individuals, likely due to fisheries interactions and contaminant loads (Kratofil et al. 2020; NOAA Fisheries 2024c). Tagged individuals have been tracked throughout all seven MHI and Niʻihau (Cascadia 2025b). Critical habitat was designated in 2018, spanning waters from the 148-foot to 10,500-foot depth contours around the MHI (Figures 10 and 12; NOAA Fisheries 2022a).

Spinner dolphins and bottlenose dolphins are the most commonly occurring dolphins in Hawaiʻi's nearshore waters. Spinner dolphins usually occur in shallow nearshore waters in the early morning and late afternoon to rest and socialize, then move further offshore in the late afternoon or early evening to

feed; this species is known to frequent Mānele Bay (DLNR 2015). Bottlenose dolphins are often seen in shallow-water around the MHI and have also been documented offshore (Cascadia 2025c).

Other Odontocetes that may occur in the Project Area include killer whales (*Orcinus orca*), melon-headed whales (*Peponocephala electra*), pygmy killer whales (*Feresa attenuata*), short-finned pilot whales (*Globicephala macrorhynchus*), and rough-toothed dolphins (*Steno bredanensis*). Beaked whales (*Mesoplodon* and *Ziphius* spp.), typically deep-water species, have occasionally been detected in nearshore Hawaiian waters as well (Cascadia 2025a).

Pinnipeds

The endemic Hawaiian monk seal/ ʻīlio-holo-i-ka-uaua (*Neomonachus schauinslandi*) is federally and state listed as endangered and MMPA depleted. Once declining, recent population growth has been documented both in the NWHI and MHI; the current population is estimated at 1,564 individuals (NOAA Fisheries 2024d). They are sighted throughout the MHI, including harbors and beaches (Baker and Johanos 2004). Hawaiian monk seals spend most of their time in the ocean, but also haul out on land for resting, pupping, nursing, molting, and avoiding predators. They primarily haul out on sandy beaches, but also utilize coral rubble, rocky and volcanic substrates (NOAA Fisheries 2007). Monk seals can give birth year-round, with a peak occurring in March through August.

Critical habitat, initially designated around the NWHI in 1988, was expanded in 2015 to include nearly all MHI coastlines and marine waters extending seaward to 656-foot water depths and 16 feet inland from shorelines (NOAA Fisheries 2022b). Several cable landing sites fall within or adjacent to this critical habitat (Figures 10 and 12).

3.6.1.7.3 Sea Turtles

Five federally and state listed sea turtle species occur in the Hawaiian Islands. These species have the potential to occur throughout the marine portions of the Project Area, inhabiting both shallow nearshore coastal waters and open pelagic waters along the submarine cable routes. Depending on the species, they also utilize onshore coastal beach habitats on the MHI, potentially including areas near certain cable landing sites. Their distribution varies by species and life stage, influenced by prey availability, reproductive behavior (especially for nesting species), and human disturbances.

The green sea turtle/ honu (*Chelonia mydas*) is the most commonly observed sea turtle in the MHI, comprising approximately 98 percent of sea turtles in Hawaiʻi (Van Houtan and Kittinger 2014). They are expected to occur regularly year-round within the marine portions of the Project Area. NOAA Fisheries has previously documented green sea turtles nesting onshore at Nukoliʻi Beach (Parker and Balazs 2015). The Central North Pacific DPS occurs in Hawaiʻi and is a single genetic stock (Dutton et al. 2014). This species inhabits shallow waters typically less than 600 feet deep and hauls out on sandy beaches throughout the MHI to bask (Parker et al. 2011). Green sea turtles are herbivores, primarily feeding on macroalgae and seagrass. They breed in small numbers locally, with nesting occurring from mid-April to September, although nesting has been documented as late as December (DAR 2025a; Allen et al. 2024). In 2023, critical habitat was proposed for five green sea turtle DPSs, including the Central North Pacific DPS. Proposed critical habitat encompasses 1,183 acres of terrestrial habitat

in the MHI (USFWS 2023b), with marine critical habitat including waters offshore the MHI from the mean high water line to 65-foot water depths (Figures 11 and 12; NOAA Fisheries 2023a,b).

The hawksbill sea turtle/ honuʻea (*Eretmochelys imbricata*) is the second most common species in Hawaiian waters and also occurs year-round within the Project Area, though is far less abundant than green sea turtles (Chaloupka et al., 2008). Their numbers have declined across the Pacific (NOAA Fisheries 2023c) but they continue to be documented in nearshore areas and within harbors in the MHI. Hawksbills nest in small numbers on isolated beaches on Maui, Molokai, Lānaʻi, and Kauaʻi (DAR 2025a; King and Fund 2011; Seitz et al. 2012; Gaos et al. 2020, 20211a). Genetic studies confirm Hawaiian hawksbills form a distinct stock, with most individuals remaining in or near the archipelago throughout their lives (Gaos et al. 2021). Hawksbill sea turtles are the most coastal of marine turtles, with juveniles and adults preferring healthy coral reef habitats for shelter and foraging (NOAA Fisheries 2023c). Hawksbills feed primarily on sponges and are commonly found around rocky outcrops, high-energy shoals, mangrove-lined bays, and estuaries (DAR 2025a; Allen et al. 2024; Parker et al. 2009). There is no critical habitat designated for this species in the Pacific Ocean.

The other three species—the leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), and olive ridley sea turtles (*Lepidochelys olivacea*)—are primarily pelagic, occur infrequently, and are transient visitors to Hawaiian waters. Observations within 29 miles of the islands are rare (DAR 2025a); as such, these species are unlikely to occur in nearshore portions of the Project Area.

3.6.1.8 Essential Fish Habitat and Habitat Areas of Particular Concern

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance essential fish habitat (EFH) for those species regulated under fishery ecosystem or management plans. EFH is defined as those waters and substrates necessary for fish to spawn, breed, feed, or grow to maturity. Management unit species (MUS) are those species that are managed under each fishery ecosystem or management plan and typically include species that are caught in quantities sufficient to warrant management or monitoring by NOAA Fisheries and the Western Pacific Regional Fishery Management Council (WPRFMC).

EFH encompasses a variety of marine environments that are critical to the life cycles of fish species managed under fishery ecosystem or management plans. These habitats may include coral reefs, seagrass beds, estuaries, and other benthic and pelagic areas that provide critical ecological functions supporting fish populations. Habitat Areas of Particular Concern (HAPCs) are specific subsets of EFH that have been identified as especially important due to their ecological significance, sensitivity, rarity, or vulnerability to degradation. HAPCs are designated to focus conservation and management efforts on habitats that are essential to sustaining fishery resources and maintaining ecosystem health. These areas often represent unique or high-quality habitats that support key life stages of fish species or are critical for maintaining biodiversity. Table 3-6 includes a summary of EFH for the major taxa within each MUS (Bottomfish MUS, Crustacean MUS, Precious Coral MUS, and Pelagic MUS) that have designated EFH within the Project Area, as well as generic habitat classes and description of spatial extent (boundaries, depth) of EFH and HAPC by life stages (eggs/larvae, juveniles, adults)

(WPRFMC 2009, 2016, 2020; Federal Register 2016). A graphic representation of the EFH boundaries for each MUS is provided below.

The designation and management of EFH and HAPCs aim to minimize adverse effects from human activities, such as construction or resource extraction. Pursuant to Section 305(b)(2) of the Magnuson-Stevens Act, federal agencies are required to consult with NOAA Fisheries on any federal action that may negatively impact these habitats. As further discussed in Section 5.1.5, a detailed EFH Assessment is being prepared and consultation with NOAA Fisheries will be conducted as part of the USACE NWP process.

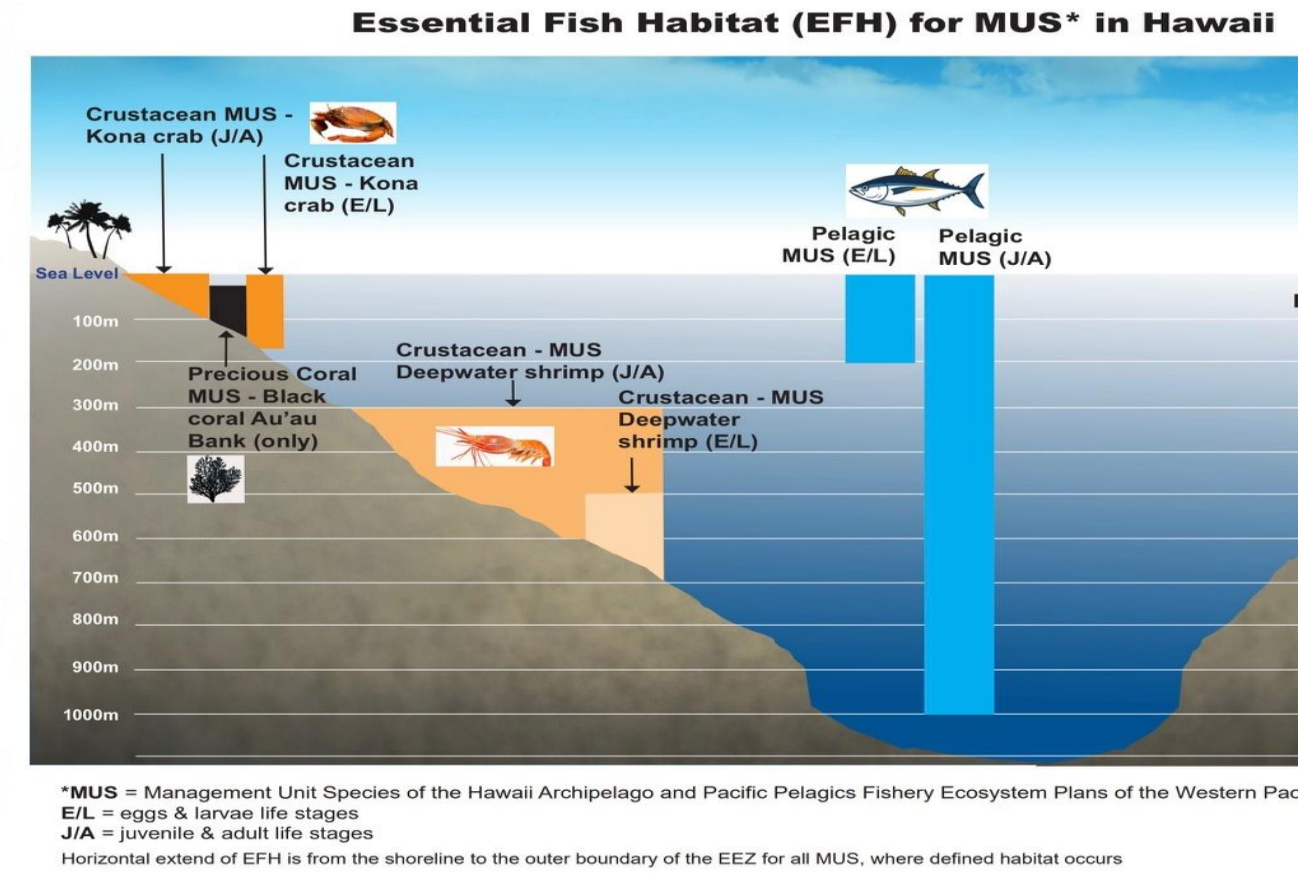


Table 3-6. EFH and HAPC Designations for Hawai‘i Archipelago MUS

Management Unit	Management Unit Species (MUS)	Habitat Classifications	Essential Fish Habitat (EFH)	HAPCs Overlapping with Cable Route
Bottomfish	Shallow-water complex: Uku or green jobfish (*Aprion virescens*)	Soft Bottom Habitats, Rocky Reef, Deep Reef Slopes, Banks	All life stages (eggs, [pelagic] larvae, juveniles/adults): the water column extending from the shoreline to the outer limit of the EEZ from 0-240 meters deep NOTE: *Uku EFH in MHI proposed as 0-300 meters deep in draft amendment (WPRFMC 2023 [draft amendment]).*	All life stages: (*see Amendment 4 for lat./long. corners of polygons*) (WPRFMC 2016; Federal Register 2016) *Penguin Banks (Molokai): All of the bank as habitat for substantial Bottomfish MUS *Makapuu Point (O‘ahu): Bottomfish MUS nursery grounds *Pailolo Channel (Maui): Nursery habitat for onaga and opaka on pavement substrate (juveniles and larvae) *Hilo (Hawaii): Habitat for 7 Bottomfish MUS (juveniles and adults)
	Intermediate-water species: Lehi or gray jobfish *(Aphareus rutilans),* Opakapaka or crimson jobfish or Hawaiian pink snapper (*Pristipomoides filamentosus),* Hapuu or Hawaiian grouper (*Hyporthodus quernus)*	Soft Bottom Habitats, Rocky Reef, Deep Reef Slopes, Banks	Eggs and (pelagic) larvae: the water column and all bottom habitat extending from the shoreline to the outer limit of the EEZ from 0-320 meters deep Juvenile/adults (post-settlement): the water column and all bottom habitat extending from the shoreline to the outer limit of the EEZ from 40-320 meters deep	
	Deep-water complex: Ehu or squirrelfish snapper (*Etelis carbunculus*), Onaga or longtail *snapper (Etelis coruscans),* Kalekale or lavender snapper (*Pristipomoides seiboldii*), Gindai or oblique-banded snapper (*Pristipomoides zonatus*)	Soft Bottom Habitats, Deep/Rocky Reef Slopes, Banks, Deep Ocean Floor, Abyssal Plain	Eggs and (pelagic) larvae: the water column and all bottom habitat extending from the shoreline to the outer limit of the EEZ from 0-400 meters deep Juvenile/adults (post-settlement): the water column and all bottom habitat extending from the shoreline to the outer limit of the EEZ from 80-400 meters deep	
Crustacean	Papa‘i kua loa or Kona crab (*Ranina ranina*)	Estuaries, Lagoons, Submerged Aquatic Vegetation, Intertidal Zone, Mangroves, Coral Reefs, Soft Bottom Habitats, Rocky Reef, Deep Reef Slopes, Outer Reef Slopes, Seamounts, Banks	Eggs and larvae: the water column from the shoreline to the outer limit of the EEZ down to a depth of 150 meters Juvenile/adults: all bottom habitat from the shoreline to a depth of 100 meters	No HAPC designated for the MHI (only for the Northwestern Hawaiian Islands)

Management Unit	Management Unit Species (MUS)	Habitat Classifications	Essential Fish Habitat (EFH)	HAPCs Overlapping with Cable Route
	Deepwater shrimp and nylon shrimp (*Heterocarpus* spp.)	Benthic habitats (typically muddy or sandy bottoms 300-700 meters deep	Eggs and larvae: the water column and associated outer reef slopes between 550-700 meters Juvenile/adults: the outer reef slopes at depths between 300 and 700 meters	No HAPC designated for deepwater shrimp
Precious Coral	Deep-water precious corals (150–750 fm): Pink coral (*Pleurocorallium secundum*), Red coral (*Hemicorallium laauense*), Gold coral (*Kulamanamana haumeaae*), Bamboo coral (*Acanella* spp.)	Deep consolidated sea-beds, typically in channels characterized by moderate to strong benthic currents	EFH for Precious Corals is confined to six known precious coral beds located off Keahole Point, Makapuu, Kaena Point, Brooks Bank, and 180 Fathom Bank.	No HAPC within cable route alignment
	Shallow-water precious corals (10–50 fm): Black coral (*Antipathes griggi, Antipathes grandis*, and *Myriopathes ulex*)	Solid substrate, typically on vertical surfaces	EFH has also been designated for three beds known for black corals in the MHI between Milolii and South Point on the Big Island, the Au‘au Channel, and the southern border of Kaua‘i.	Au‘au Channel for black corals
Pelagic fishes	Temperate species: Albacore (*Thunnus alalunga*); Bigeye tuna (*Thunnus obesus*); luefin tuna (*Thunnus thynnus*); Mackerel (*Scomber* spp.); Pomfret (family *Bramidae*); Striped marlin (*Tetrapurus audax*); Swordfish (*Xiphias gladius*) Tropical species: Yellowfin (*Thunnus albacares*); Kawakawa (*Euthynnus affinis*); Skipjack (*Katsuwonus pelamis*); Black marlin (*Makaira indica*); Blue marlin (*Makaira nigricans*); Dogtooth tuna (*Gymnosarda unicolor*); Frigate and bullet tunas (*Auxis thazard, A. rochei*); Mahimahi (*Coryphaena hippurus, C. equiselas*); Ono (*Acanthocybium solandri*); Opah (*Lampris* spp.); Sailfish (*Istiophorus platypterus*); Slender tuna (*Allothunnus fallai*), Spearfish (*Tetrapturus* spp.) Sharks: Bigeye thresher shark (*Alopias superciliosus*); Blue shark (*Prionace glauca*); Thresher shark (*Alopias vulpinus*); Pelagic thresher shark (*Alopias pelagicus*); Longfin mako shark (*Isurus paucus*); Oceanic whitetip shark (*Carcharhinus longimanus*); Salmon shark (*Lamna ditropis*), Shortfin mako shark (*Isurus oxyrinchus*), Silky shark (*Carcharhinus falciformis*) Squid: Diamondback squid (*Thysanoteuthis rhombus*); Neon flying squid (*Ommastrephes bartamii*); Purple flying squid (*Sthenoteuthis oualaniensis*)	Open ocean waters, primarily epipelagic and mesopelagic zones, and common in nutrient rich convergent zones, around FADs, and over seamounts	Eggs and larvae: the epipelagic water column to 200 meters deep, from the shoreline to the outer limit of the EEZ Juveniles/adults: the water column down to a depth of 1,000 meters from the shoreline to the outer limit of the EEZ	Water column down to 1,000 meter depth that lies above seamounts and banks with summits shallower than 2,000 meters

EEZ – Exclusive Economic Zone; HAPC – Habitat Area of Particular Concern; MUS – Management Unit Species

3.6.2 Potential Impacts and Mitigation Measures

Construction of the Project could potentially affect marine and nearshore biological resources. As described in Section 2.3.1, the Project would have a minimal footprint, involving placement of a surface-laid cable with a maximum diameter of 0.6 to 1.1 inches. HDD would be used to install underground conduit between the onshore area and an associated offshore punchout point at each cable landfall site; this method avoids and minimizes impacts to the shoreline and sensitive nearshore marine resources to the extent practicable. In some locations, articulated split pipe would be installed around the cable, helping to minimize potential impacts to the surrounding environment by restricting cable movement as well as protecting the cable from external forces.

The Project will require authorization from the USACE for construction in navigable Waters of the U.S. As further discussed in Section 5.1, the Project is expected to qualify for the USACE's Nationwide Permit (NWP) program, which authorizes certain routine activities in federally jurisdictional waters and wetlands that have no more than minimal adverse environmental impacts under a set of uniform terms and conditions. In doing so, the Project would comply with agency-specified measures to avoid and minimize potential impacts to ESA listed species (as detailed in Procedures for Endangered Species in the Central and Western Pacific Region [Pac-SLOPES]). As part of the NWP review process, consultation would be conducted pursuant to Section 7 of the ESA and Section 305(b)(2) of the Magnuson-Stevens Act to ensure minimal impacts to federally listed species and EFH, respectively.

The following sections discuss the potential impacts associated with the various Project components and activities, and the measures that would be incorporated to avoid and minimize those impacts. A detailed list of the impact avoidance and minimization measures is contained in Section 3.6.3. The listed measures are primarily based on Pac-SLOPES, which is a framework developed between NOAA Fisheries and the USACE to streamline ESA Section 7 review as part of the USACE permitting process, while simultaneously reducing or eliminating the adverse effects of regulated actions on ESA listed marine species and designated critical habitat in the region. While the measures included in Pac-SLOPES are focused on protection of federally listed species, they would also be protective of MMPA listed species, state listed species, and other marine resources. Section 3.6.3 also incorporates impact avoidance and minimization measures adapted from USFWS (2023). With incorporation of these measures, the Project is not expected to significantly affect marine biological resources.

3.6.2.1 Onshore Construction Activities

The Project has been designed to avoid construction on any shoreline and/or beach areas, with all onshore ground disturbing activities set back a minimum of at least 100 feet from the shoreline. Ground disturbance associated with onshore construction activities could impact water quality through increased erosion and sedimentation, which could in turn smother sessile species or otherwise affect benthic and other marine resources. However, in addition to being adequately set back from the shoreline, the ground disturbance at each cable landing site would be limited in extent with BMPs implemented, as detailed in Section 3.5.2. Impacts to marine water quality as a result of onshore construction activities, if any at all, would be localized and temporary. As such, it is expected that any resulting effect on marine resources including benthic resources, fish, and invertebrates would be negligible.

While no construction would occur on the shoreline, marine species that utilize the shoreline (e.g., monk seals and sea turtles) could be affected by nearby construction activities. When onshore, monk seals are highly sensitive to human disturbance. Human interactions, especially when frequent, can cause seals to abandon haul-out sites. Similarly, the presence of humans has the potential to disturb sea turtles, if present onshore. NOAA Fisheries has previously documented green sea turtles nesting at Nukoli'i Beach (Parker and Balazs 2015) and the beach is proposed as terrestrial critical habitat for green sea turtle (USFWS 2023a). Monk seals could also haul out on the sandy shoreline at Nukoli'i Beach in the vicinity of the Project Area. The likelihood of sea turtles basking and/or monk seals hauling out in the vicinity of the other onshore cable landing sites is considered low. In the unlikely event that a monk seal or sea turtle is present in the vicinity of onshore Project construction activities, individuals may become startled and stressed and would likely leave the area to avoid disturbance. As further detailed in Section 3.6.3, specific measures that would be implemented in accordance with Pac-SLOPES and USFWS recommendations include surveying for both monk seals and sea turtles before commencing work, and if present, halting work within 164 feet until the animal has voluntarily departed the area and notifying NOAA Fisheries. With implementation of these measures, adverse impacts to monk seals and sea turtles from onshore construction activities would be unlikely, infrequent, and short-term (non-injurious).

Once installed, all cable landfall infrastructure would be located at or below ground and there would be no onshore operational activities that would affect marine biological resources. Any maintenance activities would be infrequent and result in negligible disturbance.

3.6.2.2 HDD

As previously described, HDD has been incorporated into the Project to avoid impacts to the shoreline and nearshore environment by installing the cable in underground conduit along an engineered route. HDD is an industry standard that, when properly implemented, results in minimal impacts. The HDD drill pipe would be no more than approximately 6 inches in diameter, and would result in minor disturbance of the seabed at the punchout point (no more than approximately 10 feet by 10 feet per punchout); as previously described, the punchout points have been sited to avoid sensitive resources such as live coral reefs and seagrass beds to the extent practicable (see Section 3.6.2.6). Disturbance at each punchout point would temporarily increase turbidity in a small, localized area. Increased turbidity could also occur if drilling fluid (consisting of a mixture of water and bentonite, a naturally occurring, non-toxic clay) were to be accidentally released. Although occurrences are rare, if large amounts of drilling fluid were to be released, the fine particles could smother invertebrates, plants, fish, and other aquatic organisms. As detailed in Section 2.5.4, an IDFR Contingency Plan would be implemented to avoid and minimize potential impacts associated with an inadvertent release. In addition, freshwater would be used in place of drilling fluid for the final segment of drilling to further reduce risk. With these measures, it is expected that increased turbidity from HDD activities would be temporary and localized. Mobile species may temporarily avoid any affected area, while any impacts to sessile species would be short-term and minor.

3.6.2.3 Underwater Noise

HDD operations would generate continuous, low-frequency underwater noise at relatively low source levels compared to impulsive activities such as pile driving (Erbe and McPherson 2017). The cable

ship, which would be equipped with a dynamic positioning system, would generate additional underwater noise primarily in low frequencies (below 1,000 Hz) (Warner and McCrodan 2011). While dynamic positioning thrusters can produce loud noises that are audible to marine species, noise levels decrease rapidly with distance and would be limited to the duration of cable installation activities. Support vessels would be smaller and are not expected to contribute meaningfully to ambient underwater noise levels.

For invertebrates and fish, the continuous and moderate intensity of HDD noise is unlikely to cause physical injury or significant behavioral disruption. Studies indicate that non-impulsive, continuous noise sources such as HDD generally do not exceed thresholds known to cause harm to marine invertebrates or fish (Hawkins et al. 2015; Popper and Hastings 2009; Popper et al. 2014; Popper and Hawkins 2019a,b). It is expected that most mobile species would temporarily avoid the immediate vicinity of the noise source, while sessile invertebrates, which generally lack specialized auditory organs, would not experience measurable impacts due to the low intensity and short duration of exposure (André et al. 2016).

Marine mammals and sea turtles could also be exposed to underwater noise generated by HDD, the cable ship, and support vessels. Source levels produced by HDD and vessel dynamic positioning systems are well below regulatory thresholds for injury (Level A harassment) and typically within or below the range for temporary behavioral disturbance (Level B harassment) (NOAA Fisheries 2024a; Popper et al. 2014). Marine mammals may exhibit short-term avoidance or minor behavioral changes if in close proximity, but the limited spatial and temporal extent of HDD and cable installation activities, combined with implementation of Pac-SLOPES BMPs (such as monitoring and exclusion zones) further reduces the likelihood of adverse impacts. Sea turtles, whose hearing is most sensitive below 1 kHz, would unlikely be disturbed by the low-level, continuous noise generated by HDD, the cable ship, and support vessels, such that any effects would be minimal (BOEM 2025).

As further detailed in Section 3.6.3, the Project would comply with Pac-SLOPES measures that are designed to minimize the potential for noise exposure and vessel strikes; these include monitoring for ESA listed species, establishing exclusion zones, and reducing vessel speeds if ESA listed species are present (USACE 2022). With implementation of these measures, it is expected that any effects of underwater noise associated with HDD and cable-laying activities would be limited to short-term, minor impacts on marine biological resources. No long-term or population-level impacts are anticipated.

3.6.2.4 Entanglement Risks

Although possible, the risk of marine animal entanglement during subsea cable installation is extremely low. Between 1955 and 1966, there were 16 reported instances of whale entanglement with submarine telegraphic cables (Wood and Carter 2008). More recently, isolated incidents have occurred, such as a humpback whale entangled in a subsea internet cable near Tromsø, Norway in 2016 (Coghlan 2016) and a juvenile humpback whale found wrapped in coaxial cable off Maui in 2017, which was successfully disentangled and later observed as a healthy adult (Takata-Tonini 2025). Given improvements in cable design and installation practices, these cases are exceptional and the overall frequency of entanglement with modern fiber optic cables is extremely low. Entanglement would require an animal to encounter and become wrapped in a loop or coil of cable during the brief period

it is suspended in the water column. Modern fiber optic cables are designed to resist coiling and loop formation and have low breaking strength, which significantly reduces entanglement risk. The cable installation process is controlled, with rapid sink rates and a limited spatial footprint, allowing marine mammals and sea turtles to maneuver away from the cable as it settles on the seafloor.

To further minimize risk, the Project would implement Pac-SLOPES measures (USACE 2022), including monitoring for ESA listed species during installation, and establishing exclusion zones and reducing vessel speeds if present, as further discussed in Section 3.6.3. With these measures in place, the potential for entanglement of marine mammals or sea turtles is considered negligible, with no anticipated effects on population-level abundance, distribution, or survival.

3.6.2.5 Vessel Strikes

Operation of cable-laying and support vessels during Project installation introduces a potential risk of vessel strikes to marine biological resources, particularly marine mammals and sea turtles. Vessel strikes are a recognized threat to large marine fauna in areas where vessel activity overlaps with protected species, with the degree of risk influenced by vessel speed, frequency of transits, vessel size, and the behavior and abundance of marine species (Laist et al. 2001; Vanderlaan & Taggart 2007). The Project would involve a limited number of vessel trips, with the cable ship operating at a slow speed and support vessels primarily active in nearshore waters. As further detailed in Section 3.6.3, all Project vessels would comply with Pac-SLOPES, which outlines specific operational procedures to minimize the risk of vessel strikes to marine mammals and sea turtles in the Pacific region, including reduced speeds where protected species may occur and avoidance protocols when protected species are sighted (USACE 2022). With incorporation of these measures, and as further discussed below, the Project is not expected to significantly affect marine biological resources as a result of vessel strikes.

Most benthic organisms are sessile or slow-moving and reside on or within the substrate, well below the draft of passing vessels. Mobile invertebrates and fish are generally able to avoid vessels due to their mobility and the noise generated by vessel engines, which typically elicits avoidance behavior (Popper & Hastings 2009). Additionally, vessel activity associated with the Project would be limited in duration and spatial extent, further reducing the likelihood of interactions. Therefore, impacts from vessel strikes on benthic resources, fish, and invertebrates are expected to be negligible.

Vessel strikes are a well-documented source of injury and mortality for large whales found in Hawaiian waters, such as humpback whales and, to a lesser extent, sperm whales (Laist et al. 2001). Humpback whale calves and subadults are particularly vulnerable due to their prolonged surface intervals and low surface profile, making them less visible to vessel operators (Lammers et al. 2013; Zoidis et al. 2014). Historical data indicate that between 1975 and 2011, 68 vessel-whale collisions were reported in the main Hawaiian Islands, with over 63 percent involving humpback whale calves and subadults (Lammers et al. 2013). While most collisions cited in Lammers et al. (2013) were non-lethal, the risk remains, especially during the peak whale season. The areas with the highest concentrations of humpbacks during the calving and migration season are Penguin Banks and between Molokai, Maui, Kahoʻolawe, and Lānaʻi. In the case of this Project, the overall risk of strikes from the cable ship would be low due to its slow operational speed. This slower speed, coupled with other BMPs described in Section 3.6.3, would effectively minimize the likelihood of vessel strikes on humpback whales. Sperm

whales, which occur further offshore, have long surface intervals after deep dives and are large enough to be visible, such that vessel strikes are less common. Smaller cetaceans, including dolphins and smaller whales (such as false killer whales), and pinnipeds, such as Hawaiian monk seals, are less susceptible to lethal strikes due to their speed and agility but may still be injured by propellers (Oleson et al. 2010). With implementation of Pac-SLOPES measures, as listed in Section 3.6.3, the risk of Project-related vessel strikes to marine mammals is expected to be short-term and minor.

Sea turtles may also be vulnerable to vessel strikes, particularly in nearshore waters where they spend time foraging or basking at the surface. Vessel strikes can cause severe injury or mortality, and studies have shown that turtles may not be able to consistently avoid vessels traveling at moderate speeds (Hazel et al. 2007; Denkinger et al. 2013). In Hawai‘i, vessel strikes have been identified as a source of mortality for green sea turtles, with 2.5 percent of stranded turtles attributed to vessel strikes, particularly in nearshore waters (Chaloupka et al. 2008). Turtles rely on auditory cues to detect approaching vessels, and their ability to avoid strikes decreases as vessel speed increases. The Project would implement measures to minimize risk, including vigilant observation and reduced vessel speeds in areas of known or suspected sea turtle presence, as required by Pac-SLOPES. Although the likelihood of a harmful interaction is low, these measures would further reduce risk such that potential impacts to sea turtles from Project-related vessel strikes are expected to be short-term and minor.

3.6.2.6 Benthic Habitat Impacts

The HDD punchout and placement of the surface-laid subsea cable on the seafloor would result in short-term and localized disturbance of benthic habitat. As previously described, bathymetric, geophysical, and dive survey data, as well as benthic habitat mapping were used to inform siting of the HDD punchout points and cable route to avoid sensitive resources such as live coral reefs and seagrass beds to the extent practicable, as well as to minimize traversing rugged or complex hard-bottom areas in both nearshore and deeper waters. In offshore areas, the cable route would avoid complex habitats such as mapped deep-sea coral and sponge beds.

In nearshore waters where sensitive resources such as coral and seagrass are present, divers would assist with cable placement to avoid and minimize contact with these resources to the extent possible. Where hard-bottom habitats cannot be avoided or in high energy areas (e.g., areas with high water motion), split pipe may be used to restrict cable movement, thus minimizing abrasion or damage to adjacent areas. The spatial footprint of disturbance would be very small, typically limited to the width of the cable, or slightly wider, along its length. The cable-laying process would be slow and controlled to minimize unnecessary movement or dragging of the cable across the seafloor. In areas where the cable crosses soft sediment, rapid self-burial has been shown to occur within months to a few years, depending on depth and energy regime (Carter and Kraus 2018; Taormina et al. 2018). Studies of similar projects have also shown that subsea cables can also quickly become colonized by benthic organisms, sometimes enhancing local biodiversity by providing new hard substrate (Kogan et al. 2006; Taormina et al. 2018).

The only EFH and designated HAPC for Precious Coral MUS in the vicinity of the cable route is the Au‘au Channel (between Lāna‘i and West Maui), which is a designated bed for black coral. The cable

route avoids this mapped area; as such, no EFH or HAPC for any Precious Coral MUS would be impacted by the Project.

For Crustacean MUS and Bottomfish MUS, potential impacts to EFH from laying of the cable would be short-term and negligible, as individuals are mobile and are unlikely to be directly impacted by cable-laying activities, and the presence of the cable would have a negligible effect on their habitat given the cable's small spatial footprint. HAPCs for Bottomfish MUS along the cable route include Penguin Banks (along the south and west sides of Molokai), Pailolo Channel (between East Molokai and West Maui), and waters off Hilo (east of Hawai'i Island). The laying and subsequent presence of the cable in these HAPCs would similarly result in a negligible impact as the cable would only disturb a very limited footprint, and once laid, would not be expected to impact their EFH.

For Pelagic MUS, cable-laying could result in short-term and negligible impacts on EFH when the cable ship is present and the cable is within the water column. Cable-laying would not be expected to affect individuals of this MUS or EFH due to the limited spatial extent and duration of cable installation activities. It would similarly have a negligible and short-term effect on the fishery by restricting fishing in the immediate vicinity of the cable ship during installation. Once the cable has been laid, no impacts to their EFH are expected.

Under the Honolulu District Regional Conditions for 2021 NWPs and proposed 2026 NWPs, permanent loss of special aquatic sites (including coral reefs and seagrass beds) is limited to 0.1 acre (Regional Condition 2); however, USACE does not consider laying cable on the seabed to be a permanent loss of special aquatic sites. A conservative estimate of potential impacts to benthic habitat at each cable landing site is provided in the subsequent sections and summarized in Table 3-7. It is expected that impacts to seagrass would be short-term; while impacts to stony corals could be longer-term, impacted corals are expected to regrow and encrust the cable over time. Once installed, the cable would not adversely impact benthic resources or fisheries.

Table 3-7. Conservative Estimate of Potential Coral and Seagrass Impacts

Cable Landing Site	Potentially Affected Resource	Corridor Length[1/]	Impact Width[2/]	Estimated Cover[3/]	Potential Impact	
					Square Feet	Acres
Kaua'i	Coral Reef Rubble	90 feet	3 feet	3%	8	0.0002
O'ahu	Seagrass	2,790 feet	1.1 – 7.75 inches	100%	386	0.009
Molokai	Seagrass	1,465 feet	1.1 – 7.75 inches	75 – 80%	173	0.004
	Coral Reef (inner harbor)	800 feet	1.0 feet	100%	800	0.018
	Coral Reef Rubble (outer harbor)	1,195 feet	1.5 feet	3%	54	0.001
Hawai'i Island	Coral Reef	850 feet	1 – 3 feet	50 – 90%	1,689	0.04

1/ Impact corridor length is based on dive survey results and benthic habitat mapping from HDD punchout point to 100-foot water depths (safe diving limit).

2/ Potential impacts in areas with soft substrate that support seagrass are based on the width of the cable/split pipe (up to 7.75 inches, to account for the flanges). Potential impacts in areas that support coral reef or coral rubble are based on a corridor width ranging between 1 to 3 feet to account for incidental impacts during cable installation (e.g., diver fin kicks, cable movement, etc.); assumed impact width is based on variables including water depth and coral growth forms.

3/ Estimated cover is based on the dive survey results, with an increase in assumed cover to account for uncertainty (e.g., due to poor visibility during dive survey at Molokai cable landing site, macroalgae overgrowth at Hawai'i Island cable landing site, etc.).

3.6.2.6.1 Kaua‘i Cable Landing Site

As described in Section 3.6.1.1, dive surveys conducted for the Kaua‘i cable landing site indicated the marine benthic substrate is primarily flat, low rugosity limestone pavement. Apart from turf algae and various macroalgae, the benthic biota is relatively sparse, except for an overhanging ledge populated by black coral. Based on the results of the dive surveys, the HDD punchout point was sited beyond the overhanging ledge, thus avoiding impacts to black coral in this area. The HDD punchout and surface-laid cable route would be in an area with very little coral or live rock. Through diver-directed placement of the cable, along with implementation of the IDFR Contingency Plan, it is expected that impacts to coral would be avoided; split pipe would be added around the cable, helping to further avoid potential impacts by restricting cable movement.

While it is anticipated that the cable would be installed along a route that entirely avoids corals, it has been conservatively assumed that some incidental impacts could occur to nearby corals during installation (e.g., fin kicks and unexpected cable movement during installation). While the cable with split pipe would only be approximately 5 inches wide along the majority of its length, the conservative impact assessment assumes potential impacts could occur within a 3-foot-wide corridor during installation. Per the benthic habitat mapping (Figure 9.1), the potential impact corridor is approximately 90 feet long (from the HDD punchout to approximately 100-foot water depths); based on an estimated cover of 3 percent of coral within the potential impact corridor, the conservative estimate of potential coral impacts is approximately 8 square feet total (Table 3-7). Adverse impacts to live rock are not anticipated as very little occurs and the presence of surface-laid cable would not adversely affect this resource. For these reasons, potential impacts to coral and live rock at the Kaua‘i cable landing site would be negligible.

3.6.2.6.2 O‘ahu Cable Landing Site

At the O‘ahu cable landing site, the benthic habitat composition around the proposed HDD punchout points is sandy substrate devoid of seagrass and corals; very few corals were observed in the vicinity of the cable routes (<1 percent cover). Macroalgae and seagrass occur offshore from the punchout points along the cable route up to water depths of approximately 85-98 feet (Figure 9.2).

Given the very limited occurrence, no potential impacts to coral or live rock are anticipated at this cable landing site. It is expected that any such resources would be easily avoided through diver-directed placement of the cable and implementation of the IDFR Contingency Plan. Split pipe would be added around the cable in the vicinity of the punchout points, helping to further minimize the potential for impacts by restricting cable movement. As the cable would traverse patches of seagrass, this resource could be impacted by cable installation. Based on the cable width and a conservative assumption of 100 percent coverage from the HDD punchout points to the maximum depth observed for both cable segments, it is estimated that a total of approximately 386 square feet of seagrass could be disturbed (Table 3-7). As evidenced by other similar projects, it is expected that the cable would rapidly self-bury in the sandy substrate, allowing any disturbed seagrass to regrow. As such, it is anticipated that impacts to seagrass for the O‘ahu cable landing site would be short-term and minor.

3.6.2.6.3 Maui Cable Landing Site

At the Maui cable landing site, the area around the HDD punchout point and along the cable routes comprise sand habitat with very sparse biota (Figure 9.3). During dive surveys conducted for the Project, no corals, seagrass, or other sensitive marine species were observed. Adjacent to the cable route, occasional patches of hard substrate or rocks overgrown with algae were observed, but these are sufficiently sparse and distant from the cable route such that they would not be affected. No impacts to coral, live rock, or seagrass are anticipated at the Maui cable landing site.

3.6.2.6.4 Molokai Cable Landing Site

At the Molokai cable landing site, the HDD punchout point and nearshore cable route lie in shallow water over bottom composed of sand and fine sediment, with a few scattered patches of hard substrate harboring few small colonies of coral. Several species of macroalgae and seagrass patches (*Halophila* sp.), with 20 to 40 percent assumed seasonal maximum cover, dominate the biota in this area. Due to the limited visibility, it was conservatively assumed that 75-80 percent of the cable route overlapped with seagrass. Installation of the HDD punchout and cable route could affect seagrass in this area; based on the punchout area, cable width, and conservative estimates of percent cover, potential impacts to seagrass have been estimated to be less than 173 square feet.

As previously described, based on the dive survey results, the portion of the cable route adjacent to the harbor basin was adjusted to be along the edge of the basin floor, specifically to avoid and minimize impacts to corals that have colonized the adjacent channel wall (Figure 9.4). Divers would be used to preferentially lay the cable within the soft sediment of the harbor basin floor, avoiding any corals along the harbor wall to the extent feasible. However, due to the limited bend radius of the cable as well as the need to also minimize encroachment into the dredged harbor basin, it is possible that the cable may need to pass over several areas where fallen coral rubble or other portions of the colonized harbor wall extend onto the basin floor. While the cable would only be 1.1 inches in diameter and could likely be routed to avoid most coral, it has been conservatively assumed that impacts could occur within a 1-foot-wide corridor with 100 percent coral cover across all hard bottom areas (to account for limited visibility during dive surveys) along a cumulative length of approximately 800 feet along the harbor wall, thus resulting in up to approximately 800 square feet of potential impacts (Table 3-7).

Outside of the harbor, the benthic habitat comprises pavement with very few sporadic coral heads. While it is anticipated that the cable could be installed along a route that entirely avoids corals, it has been conservatively assumed that incidental impacts could occur to nearby corals during installation. Based on a 1.5-foot-wide impact corridor over approximately 1,195 feet of the cable route, with an estimated 3 percent cover, potential impacts to live corals beyond the harbor have been conservatively estimated to be approximately 54 square feet (Table 3-7).

Overall, the estimated seagrass and coral impacts are highly conservative estimates as divers would aid in placement of the cable, preferentially routing it on soft bottom away from rocky/reef areas to the extent feasible, thus minimizing potential impacts to these resources. In areas where the cable must be routed across rocky/reef habitat with corals present, it is expected that actual impacts would be relatively minimal as the corals present are primarily composed of encrusting growth forms and cable placement would not be expected to affect the entire coral colony. Given the prevalence of fine

sediments and existing high turbidity load, it is anticipated that the cable would quickly self-bury along much of its path on the harbor floor, allowing seagrass to repopulate as well as any damaged corals/benthic biota to overgrow portions of the cable on hard substrate with time. For these reasons, it is expected that impacts to seagrass and corals at the Molokai cable landing site would be relatively short-term and minor.

3.6.2.6.5 Lānaʻi Cable Landing Site

The HDD punchout point and cable route for the Lānaʻi cable landing site is entirely comprised of sand substrate (Figure 9.5). No corals, seagrass, or other sensitive biota were observed along the route. As such, no impacts to coral, live rock, or seagrass are anticipated at this site.

As previously described, the cable segment for the Lānaʻi cable landing site would traverse the Mānele-Hulopoʻe MLCD. Given that the Project would not impact any coral, live rock, or other sensitive marine resources, restrictions associated with the MLCD pursuant to HAR Section 13-30 are not expected to be applicable.

3.6.2.6.6 Hawaiʻi Island Cable Landing Site

At the Hawaiʻi Island cable landing site, the HDD punchout point occurs in silty sandy substrate, with no corals, epibenthic non-coral invertebrates, macroalgae, or seagrass. Offshore of the punchout point, the surface-laid cable route extends through a series of elongated reef mounds interspersed with sand-filled channels out to approximately 85-foot water depths. As shown on Figure 9.6, cable routing at this location prioritized placement within mapped sand channels, which are devoid of visible macrobiota, and avoided hard substrate to the extent feasible. Given the density and abundance of hard-bottom habitat and coral reef substrate in this region, full avoidance of these resources is not possible and cable installation would result in some adverse impacts to live corals and typical reef organisms. However, divers would be used to install the cable, maximizing cable alignment within the sand channels, to the extent possible. Where no sand channels are present, the cable would need to cross several segments of coral reef habitat; these areas vary in length, with up to 50-90 percent live coral cover. To prevent wave-induced cable movement that could further damage the underlying coral reef in this high energy environment, split pipe would be installed around the cable and secured to the hard substrate.

Once installed, the split pipe located across reef habitat would have an approximate footprint of less than 560 square feet; however, to be conservative, the impact assessment assumed a much wider impact corridor to account for potential impacts during cable installation. The assumed corridor width was defined based on the various coral growth forms coupled with the depth of the water, ranging from 1 foot wide (in areas of shallow water with primarily small branching coral and encrusting growth forms) to 3 feet wide (in areas of deeper water with increased abundance of plating growth forms). Furthermore, the impact assessment assumed that the cable would need to be routed entirely across coral reef habitat and did not account for placement within sand channels with the exception of one large and wide sand channel (as shown in Figure 9.6). Based on these conservative assumptions regarding impact width and percent cover, the maximum extent of potential coral impacts at this cable landfall is approximately 1,689 square feet; in actuality, it is anticipated that

impacts would be substantially less. As experienced with subsea cable systems in other similar locations, it is expected that over time, corals would colonize the portions of the cable that traverse hard bottom. For these reasons, coral impacts at the Hawai‘i Island cable landing site are expected to be relatively short-term and minor.

While the potential impacts to corals are not expected to be significant, it is recognized that corals are a valued ecological and community resource. As such, the Project would incorporate efforts to provide benefits related to the coastal environment within or near the Project Area as a means to offset the effects of cable installation. Any such efforts would be coordinated with NOAA Fisheries and DAR, with input from the community as appropriate, through the permitting process.

3.6.2.6.7 Deep Sea Interisland Benthic Habitat

As discussed in Section 3.6.1, existing data were used to inform routing of the subsea cable through deepwater interisland benthic habitats with the intent of avoiding known steep slopes, cross slopes, pinnacles, and rocky outcrops to the extent practicable. The intent of this was to route through soft-bottom substrates and to avoid complex habitats and hard bottom habitats as those areas are generally more sensitive to disturbance and may be suitable habitat for deep-sea corals and precious corals. Based on the existing bathymetric data, soft-bottom substrates are the predominant habitat type across the entirety of the cable route.

Overall, potential impacts to deep sea interisland benthic habitat are anticipated to be negligible, highly localized in spatial extent and magnitude, and short term. This is due to the narrow width of the cable (approximately 0.9-inch diameter or smaller out to 3,281-foot water depths, and 0.6-inch diameter in deeper water depths), low velocity of the cable laying operation, and abundance of similar habitat in the surrounding areas. Based on an estimated length of 218 miles of cable across all EFH designated substrate (i.e. interisland seafloor shallower than 3,281 feet for all MUS and life stages collectively) under the Hawaiian Archipelago and Pacific Pelagics Fishery Ecosystem Plan, the total impact area would be 2.1 acres across the MHI. Furthermore, it is anticipated that the cable would rapidly self-bury in soft sediment or would be colonized and overgrown by benthic organisms. Consequently, it is expected that potential adverse effects to EFH and general benthic impacts associated with the cable-laying activity in the deep-sea interisland channels would be negligible.

3.6.3 Impact Avoidance and Minimization Measures

As previously described, design of the proposed cable route sought to limit the extent to which the cable traversed shallow waters and prioritized cable placement on deep, soft-sediment seafloor in areas with minimal seagrass and living coral, to avoid and minimize impacts to marine species and their habitat to the extent practicable. Furthermore, HDD was incorporated into the design to accommodate cable landfall while avoiding impacts to shoreline and sensitive nearshore resources; an IDFR Contingency Plan would be implemented to avoid and minimize impacts in the unlikely event of accidental release of drilling fluid. Applicable measures specified in Pac-SLOPES (USACE 2022) as well as USFWS recommended measures, which are listed below, would be implemented to further avoid and minimize potential Project-related impacts to federally listed species; these measures

would also help to protect state listed species, MMPA listed species, and other sensitive marine resources.

Pac-SLOPES: General BMPs

- (3) To minimize impacts to coral larvae, notably the listed species covered in this programmatic consultation, the permittee shall avoid in-water work during mass-coral spawning times or peak coral spawning seasons June 1 to September 30 if practicable. The Corps must consult with the National Marine Fisheries Service (NMFS) HCD biologist to determine the period and dates when coral spawning will occur for the given year.
- (4) Constant vigilance shall be kept for the presence of ESA-listed marine species (sea turtles, marine mammals, sharks, rays) during all aspects of the proposed action.
- (5) A responsible party (i.e. permittee/site manager/project supervisor) shall designate an appropriate number of competent trained observers to survey the areas adjacent to the authorized work area (i.e. proposed action) for ESA-listed marine species. The competent observer will not be simultaneously engaged in any other activity (e.g., captaining, operating equipment, etc.).
- (6) Surveys shall be made prior to the start of work each day, and prior to resumption of work following any break of more than one half hour. Additional periodic surveys throughout the work day are strongly recommended.
- (7) All work shall be postponed or halted when ESA-listed marine species are within 50 meters (54.7 yards, 164 feet) of the proposed work, and will only begin/resume after the animals have voluntarily departed the area. If ESA-listed marine species are noticed within 50 meters (54.7 yards, 164 feet) after work has already begun, that work may continue only if, in the best judgement of a biologist, the activity will not adversely affect (i.e. disturb or harm) the animal(s). For example: divers performing underwater work (excluding the use of toxic chemicals) such as surveys would likely be permissible, whereas operation of heavy equipment is not.
- (8) Project-related personnel shall not conduct activities resulting in take of an ESA-listed species, a species proposed for listing, or listed or proposed critical habitat. “Take” as defined under the ESA means “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.” Activities that would qualify as take include attempting to disturb, touch, ride, feed, or otherwise intentionally interact with any protected species.
- (9) Sensitive resource areas, such as corals, coral reefs and seagrass beds known to occur within a project area must be identified on project figures. Project staff must be instructed to avoid the sensitive resource areas to the greatest extent practicable, including avoiding anchoring in these areas, flagging the areas if appropriate, and securing all in-water equipment in a manner that will prevent the equipment from being dragged across the substrate.
- (10) Project construction must cease under unusual conditions, such as large tidal events and high surf conditions, except for efforts to avoid or minimize resource damage.

- (11) When a diver is involved in the action, the diver will do their best to avoid ESA-listed species. If an animal traverses within 50 m, however, the diver will take into account his/her own personal safety. The diver will report the interaction via the reporting requirement in General BMP 13.
- (12) If an ESA-listed species is adversely affected as a result of the project, all work must stop until coordination with the Corps and NMFS has been completed.
- (13) Reporting
  - Any monk seal sightings:
    - At the time of observation, the observer will report the sighting to the NOAA Statewide Hawai'i Marine Wildlife Hotline at 888-256-9840. The observer will be prepared to provide information to the hotline operator about the sighting location and other site-specific information to help the operator determine the most appropriate response, if any.
    - The observer will email documentation of Hawaiian monk seal sightings (e.g., photos, video, reports, etc.) to: pifsc.monksealsighting@noaa.gov, with the subject line indicated as: "Monk seal sighting documentation per Pac-SLOPES ESA section 7 consultation." Documentation will always include the specific sighting location and the contact information of the reporting party.
  - Observer logs. All interactions with listed species must be documented and reported to the Corps and NMFS in monitoring logs (Pac-SLOPES Appendix C).
    - Monitoring logs shall be completed daily. If no ESA-listed species are observed, the observer will record "0" in the daily report.
    - The monitoring logs will be submitted in a digital and queryable format to NMFS reporting contact(s) in Table 1, with the following information:
      - Total hours and dates of monitoring,
      - Identification of which ESA species were observed and in what location and circumstances, including date, numbers of individuals of species observed, the outcome of the species observance relative to the authorized project, and any factors which may have affected visibility
      - If applicable, observed ESA species behaviors and movement types relative to the project activity at time of observation
    - All monitoring logs must be submitted to the NMFS within 90 calendar days of the completion of the project. The Corps will provide final reports to NMFS as part of the annual report.

Pac-SLOPES: BMPS for Waste and Discharge

- (1) A stormwater management plan, commensurate to the size of the project, must be prepared and carried out for any project that will produce any new impervious surface or a land cover conversion that will slow the entry of water into the soil to ensure that effects to water quality and hydrology are minimized.

- (2) An erosion control plan for the project site and adjacent areas must be prepared and carried out. Erosion controls must be properly installed before any alteration of the project area may take place.
- (3) A pollution control plan for the project site and adjacent areas must be prepared and implemented. At a minimum, this plan shall include:
    a) Proper installation and maintenance of equipment diapers, or drip pans;
    b) A contingency plan to control and clean spilled petroleum products, hydraulic leaks, and other toxic materials.
    c) Appropriate materials to contain and clean potential spills will be stored at the work site and be readily available.
    d) All project-related materials and equipment placed in the water will be free of pollutants.
    e) Daily pre-work inspections of heavy equipment and vessels for cleanliness and leaks, with all heavy equipment operations and vessel use postponed or halted until leaks are repaired and equipment is cleaned.
    f) Fueling of land-based vehicles and equipment shall take place at least 50 feet (15 meters) away from the water, preferably over an impervious surface.
    g) All construction discharge water (e.g., concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) must be treated before discharge.
    h) Debris and other wastes will be prevented from entering or remaining in the marine environment during the project.
- (6) All disturbed areas must be immediately stabilized following cessation of activities for any break in work longer than 4 days.
- (7) Drilling and dredging are restricted to uncontaminated areas, and any associated waste or spoils must be completely isolated and disposed of in an approved upland disposal location

Pac-SLOPES: BMPs Related to Direct Physical Contact

- (1) Before any equipment, anchor(s), or material enters the water, a responsible party, i.e. permittee/site manager/project supervisor, shall verify that no ESA-listed marine animals are in the area where the equipment, anchor(s), or materials are expected to contact the substrate. If practicable, the use of divers to visually confirm that the area is clear is preferred.
- (2) Equipment operators shall employ “soft starts” when initiating work each day and after each break of 30 minutes or more that directly impacts the bottom. Buckets and other equipment shall be sent to the bottom in a slow and controlled manner for the first several cycles before achieving full operational impact strength or tempo.
- (3) All objects lowered to the bottom shall be lowered in a controlled manner. This can be achieved by the use of buoyancy controls such as lift bags, or the use of cranes, winches, or other equipment that affect positive control over the rate of descent.

Pac-SLOPES: BMPs Related to Entanglement

- (1) Temporary in-water tethers, as well as mooring lines for vessels and marker buoys shall be kept taut to the minimum length necessary, and shall remain deployed only as long as needed to properly accomplish the required task.
- (2) Mooring systems shall employ the minimum line length necessary to account for expected fluctuations in water depth due to tides and waves.
- (3) Mooring systems shall be designed to keep the line as tight as possible, with the intent to eliminate the potential for loops to form.

Pac-SLOPES: BMPs Related to Elevated Noise Levels

- (1) Maintenance dredging, in-water excavation, movement of large armor stones, and benthic core sampling shall not be undertaken if any ESA-listed marine animals are within 50 meters (54.7 yards, 164 feet) of the authorized work, and those operations will immediately shut-down if an ESA-listed marine animal enters within 50 meters (54.7 yards, 164 feet) of the authorized work. This condition is intended to ensure that no ESA-listed marine animals are exposed to sound levels anywhere near the TTS threshold isopleths.

Pac-SLOPES: BMPs Related to Vessel Strikes

- (1) When piloting vessels, vessel operators shall alter course to remain at least 100 meters (109 yards) from whales, and at least 50 meters (54.7 yards, 164 feet) from other ESA-listed marine animals.
- (2) Reduce vessel speed to 10 knots or less when piloting vessels in proximity of ESA-listed marine mammals, sharks, and rays.
- (3) Reduce vessel speed to 5 knots or less when piloting vessels in areas of known or suspected sea turtle activity.
- (4) If despite efforts to maintain the distances and speeds described above, a marine mammal or turtle approaches the vessel, the vessel operator will put the engine in neutral until the animal is at least 15 meters (~50 feet) away, and then slowly move away to the prescribed distance.
- (5) Marine mammals, sea turtles and other ESA-listed motile species shall not be encircled or trapped between multiple vessels or between vessels and the shore.

Pac-SLOPES: Utility Line Installation and Repair

- (1) Utility line placement location and method must be designed to avoid to the greatest extent practicable, impacts to live corals, submerged aquatic or marine vegetation and other benthic organisms, and wetlands.

Pac-SLOPES: Stranded, Injured, Sick, or Dead Marine Mammal or Turtle

- (1) If observers become aware of any injured, sick, or dead marine mammal or turtle (whether or not it may be related to the proposed action), they will immediately call the NOAA Statewide 37 Hawai‘i Marine Wildlife Hotline at 888-256-9840. The observer will be prepared to

provide information to the hotline operator about the animal's condition, location, and other information specific to the situation to help the operator determine the most appropriate response.

- (2) The observers will submit photos and data as soon as possible regarding stranded, injured, sick, or dead marine animals that NMFS may use to inform NMFS-directed field responses and/or further analysis to determine whether a taking resulted (see 3. below). Photos and data submitted to NMFS regarding stranded, injured, sick, or dead marine animals will include date, time, location, species, and number of animals, as well as a description of the animal's condition, event type (e.g., entanglement, dead, floating), and behavior of live-stranded marine animals. The observers will email this documentation to: respectwildlife@noaa.gov, with the subject line indicated as: "Stranded animal information per Pac-SLOPES ESA Section 7 consultation."
- (3) If NMFS responders determine the proposed action resulted in the taking, reinitiation is warranted. The Corps will collect the following information and include it in the reinitiation request: (a) number of individuals and species of listed animals affected; (b) the date, time, and location of each event (provide geographic coordinates); (c) description of the event; (d) the time the animal(s) was first observed or entered the shutdown zone, and, if known, the time the animal was last seen or exited the zone, and the fate of the animal; (e) mitigation measures implemented prior to and after the take; (f) if a vessel struck a marine mammal, the contact information for the observer on duty, or the contact information for the individual piloting the vessel if there was no observer on duty; and, (g) photographs or video footage of the animal(s) (if available).

USFWS Recommended Measures

In addition to Pac-SLOPES measures, the Project would also incorporate the following measures, adapted from USFWS (2023).

- At cable landing sites with beach habitat, vehicles would not be used on the beach area and the beach area would not be modified during the sea turtle nesting and hatching season (May through December).
- A biologist (or qualified, trained individual) familiar with sea turtles and monk seals would conduct a visual survey of the coastal portions of the cable landing sites immediately prior to work to ensure no sea turtles or monk seals are present. If these species are found within the Project Area, cease all mechanical or construction activities within 100 feet until the animal voluntarily leaves the area.
- Any project-related debris, trash, or equipment would not be left on the beach/shoreline if not actively being used.
- Project-related materials would not be stockpiled in the intertidal zone, reef flats, and sandy beach.
- Nighttime work that involves construction lighting would be avoided during the sea turtle nesting (May-September) and hatching season (November-December).

- The use of lighting on or near beaches would be minimized. Operational on-site lighting would be shielded so the light is not visible from the beach/shoreline.
- The construction and operation of buildings adjacent to the beach/shoreline would be designed to reduce ambient outdoor lighting.
- All project construction-related materials and equipment to be placed in an aquatic environment (e.g., vessels) would be inspected for pollutants (e.g., marine fouling organisms, grease, oil) and cleaned to remove pollutants prior to use. Project related activities would not result in any debris disposal, non-native species introductions, or attraction of non-native pests to the affected or adjacent aquatic or terrestrial habitats.
- Project construction-related materials would not be stockpiled in, or in close proximity to aquatic habitats and should be protected from erosion to prevent materials from being carried into waters by wind, rain, or high surf.
- Fueling of project-related vehicles and equipment would take place away from the aquatic environment and a contingency plan to control petroleum products accidentally spilled during the Project would be developed.

3.7 Terrestrial Biological Resources

3.7.1 Affected Environment

Field surveys of terrestrial biological resources were conducted for each cable landing site in 2024 and 2025. The purpose of the surveys was to characterize the species and habitats present, and to determine whether federally or state listed threatened or endangered species (pursuant to the ESA or HRS Chapter 195D) or otherwise rare plants or animals have the potential to occur and could be impacted by construction or operation of the Project. In general, the cable landing sites have been highly modified by previous land uses and the introduction of invasive species, which has resulted in a decreased number and abundance of native species and habitats suitable for native species. The results of the terrestrial biological surveys are summarized below. Additional details are provided in the Biological Resources Survey Reports, which are contained in Appendix G.

3.7.1.1 Vegetation

No wild (naturally-occuring) individuals of federally or state listed threatened, endangered, proposed listed, or candidate plant species were observed within the Project Area at any of the cable landing sites during the biological surveys. However, one endangered plant species—loulu (*Pritchardia napaliensis*)—is planted within the KCC portion of the Project Area for the Kauaʻi CLS (see details in Section 3.7.1.3). In total, 18 native Hawaiian plant species were observed within the overall Project Area for all cable landing sites (Table 3-8). None of the wild (naturally-occuring) plants are considered rare throughout the Hawaiian Islands. A description of the vegetation within the Project Area for each cable landing site is provided below.

Table 3-8. Native Plant Species Recorded within the Project Area

Common/ Hawaiian Name(s)	Scientific Name	Status	Cable Landing Site					
			Kaua'i	O'ahu	Molokai	Lāna'i	Maui	Hawai'i Island
No common name	*Cyperus polystachyos*	I						●
'ae'ae	*Bacopa monnieri*	I	●					
'aki'aki	*Sporobolus virginicus*	I	●	●			●	
'ākulikuli	*Sesuvium portulacastrum*	I	●	●			●	
alena	*Boerhavia repens*	I	●					
hau	*Hibiscus tiliaceus*	I	●				●	
hoary abutilon	*Abutilon incanum*	I				●		
kīpukai, seaside heliotrope	*Heliotropium curassavicum*	I	●	●	●		●	
koki'o ke'o ke'o	*Hibiscus waimeae subsp. waimeae*[1/]	E	●					
kou	*Cordia subcordata*[1/]	I	●		●	●	●	
loulu	*Pritchardia napaliensis*[1/3/]	E	●					
milo	*Thespesia populnea*[1/]	I	●	●				
naio	*Myoporum sandwicense* subsp. *sandwicense*[1/2/]	E		●			●	
naupaka kahakai	*Scaevola taccada* var. *taccada*	I	●	●	●		●	●
pā'ū o Hi'iaka	*Jacquemontia sandwicensis*	I		●			●	
pōhinahina	*Vitex rotundifolia*[1/]	I	●			●		
pōhuehue	*Ipomoea pes-caprae* subsp. *brasiliensis*	I	●	●		●	●	
'uhaloa	*Waltheria indica*	I		●		●	●	

Status: E = Endemic (native only to the Hawaiian Islands); I = Indigenous (native to the Hawaiian Islands and elsewhere).
1/ Only planted; not naturally-occurring (wild).
2/ The naio on the edge of the O'ahu cable landing appears to be planted, but that could not be confirmed.
3/ Federally and state listed as endangered.

3.7.1.1.1 Kaua'i Cable Landing Site

As stated above, one endangered plant species—loulu (*Pritchardia napaliensis*)—is planted within the KCC portion of the Project Area for the Kaua'i cable landing site. In total, thirteen native plant species were recorded in the Project Area on Kaua'i during the surveys (Table 3-8**Table *3-8***). All of these species are indigenous to the Hawaiian Islands (Wagner et al. 2023), except the endemic species koki'o ke'o ke'o (*Hibiscus waimeae* subsp. *waimeae*) and the endangered loulu, both of which only occur as planted individuals. Vegetation is characterized by three vegetation types: Maintained Beach Park Vegetation, Coastal Strand, and Landscaped Areas.

- Maintained Beach Park Vegetation: This vegetation type occurs in the eastern portion of the Project Area at Nukoli'i Beach Park, surrounding the park facilities. It is primarily comprised of maintained grassy areas dominated by St. Augustine grass (*Stenotaphrum secundatum*) and Bermuda grass (*Cynodon dactylon*) mixed with weedy, non-native naturalized and planted ornamental species including beach wiregrass (*Dactyloctenium aegyptium*), nut grass (*Cyperus rotundus*), wedelia (*Sphagneticola trilobata*), red-flowered sida (*Sida ciliaris*), and wide-leaved carpetgrass (*Axonopus compressus*). The native naupaka kahakai (*Scaevola taccada* subsp.

taccada) and Polynesian-introduced coconut palm/ niu (*Cocos nucifera*) are planted near the park facilities. A large clump of Christmas berry (*Schinus terebinthifolia*) and the native milo (*Thespesia populnea*) occur near the shore. Scattered individuals of the native ʻākulikuli (*Sesuvium portulacastrum*), alena (*Boerhavia repens*), kīpukai (*Heliotropium curassavicum*), pōhuehue (*Ipomoea pes-caprae* subsp. *brasiliensis*) and ʻaeʻae (*Bacopa monnieri*) also occur.

- Coastal Strand: This vegetation type occurs as a relatively narrow band between the maintained park vegetation and the shoreline. It is dominated by patches of the native naupaka kahakai and native ʻakiʻaki (*Sporobolus virginicus*) grass, as well as scattered non-native tree heliotrope (*Heliotropium arboreum*). Other species include maunaloa (*Canavalia cathartica*), beach wiregrass, alena, and sourbush (*Pluchea carolinensis*).
- Landscaped Areas: Within the Nukoliʻi Beach Park portion of the Project Area, the landscaped vegetation along the edge of the roadways consists of maintained grass or ground cover and planted trees and shrubs. The maintained grassy areas are predominately comprised of Bermuda grass, St. Augustine grass, or wide-leaved carpet grass. Planted ornamental species include wedelia, *Pseuderanthemum carruthersii*, *Dracaena reflexa*, and oleander (*Nerium oleander*), coconut palms, areca palms (*Dypsis lutescens*), Chinese hibiscus (*Hibiscus rosa-sinensis*), and a hedge of koa haole (*Leucaena leucocephala* subsp. l*eucocephala*). Large ficus trees (*Ficus* sp.) occur along Kauaʻi Beach Drive, and non-native ironwood (*Casuarina equisetifolia*) and the native hau (*Hibiscus tiliaceus*) overhang parts of Kauaʻi Beach Road. Various weedy species occur including Chinese violet (*Asystasia gangetica*), Carolina love grass (*Eragrostis pectinacea*), pitted beardgrass (*Bothriochloa pertusa*), coat buttons (*Tridax procumbens*), and creeping indigo (*Indigofera spicata*).

  Vegetation in the KCC portion of the Project Area is entirely comprised of Landscaped Areas, consisting of open, maintained lawns with native and ornamental species planted around building edges and walkways. The lawn is comprised of several grasses including St. Augustine grass, Hilo grass (*Paspalum conjugatum*), and wide-leaved carpet grass. Low-growing weeds growing in the Landscaped Areas include love grass (*Eragrostis tenella*), nut sedge, hairy spurge (*Euphorbia hirta*), *Calyptocarpus vialis*, *Centella asiatica*, *Galinsoga parviflora*, narrow-leaved plantain (*Plantago lanceolata*), and creeping indigo. Several native species are planted within this portion of the Project Area (Table 3-8), including naupaka kahakai, milo, pōhinahina (*Vitex rotundifolia*), kokiʻo keʻo keʻo, kou (*Cordia subcordata*), and the endangered loulu palm. Various ornamental non-native species are planted in the area including MacArthur palm (*Ptychosperma macarthurii*), fern tree (*Filicium decipiens*), kukui (*Aleurites moluccana*), Yeddo hawthorn (*Raphiolepis umbellata*), Chinese hibiscus, money tree (*Dracaena marginata*), snowbush (*Breynia disticha*), and ti/ kī (*Cordyline fruticosa*).

3.7.1.1.2 Oʻahu Cable Landing Site

The Oʻahu cable landfall is dominated by plants non-native to the Hawaiian Islands. Nine native plant species were observed within the Project Area at this site (Table 3-8), none of which are considered rare, threatened, or endangered. Vegetation is characterized by two vegetation types: Maintained Beach Park Vegetation and Coastal Strand.

- Maintained Beach Park Vegetation: This is the primary vegetation type within the Project Area for the Oʻahu cable landing site and is comprised of mowed grassy areas mixed with non-native naturalized and planted ornamental species. The mowed grassy areas are dominated by Bermuda grass and buffelgrass (*Cenchrus ciliaris*). Weedy species growing among and along the disturbed edges include pitted beardgrass, Guinea grass (*Megathyrsus maximus*), wiregrass, swollen fingergrass, khaki weed, Australian saltbush (*Atriplex semibaccata*), saltbush (*Atriplex suberecta*), *Euploca procumbens*, red-flowered sida, *Calyptocarpus vialis*, *Sesuvium verrucosum*, false mallow, obscure morning glory (*Ipomoea obscura*), beggartick (*Bidens alba* var. *radiata*), slender mimosa (*Desmanthus pernambucanus*), and Indian fleabane (*Pluchea indica*). Coconut palms, shower trees (*Cassia* sp.), and kiawe (*Neltuma pallida*) are among the planted species. Patches of the native pāʻū o Hiʻiaka (*Jacquemontia sandwicensis*) are present in the grassy areas. Other scattered native species include kīpukai, ʻākulikuli, milo, and ʻuhaloa (*Waltheria indica*), and a few naio (*Myoropum sandwicense* subsp. *sandwicense*) individuals occur along the western boundary.
- Coastal Strand: This vegetation type occurs as a relatively narrow band between the maintained park vegetation and the beach. It is dominated by the native naupaka kahakai and pōhuehue. Non-native weedy plants occurring as scattered individuals in this vegetation type include *Sesuvium verrucosum*, red-flowered sida (*Sida ciliaris*), and Indian fleabane. The natives ʻakiʻaki, pāʻū o Hiʻiaka, kīpukai, and ʻākulikuli are also present.

3.7.1.1.3 Maui Cable Landing Site

The vegetation in the Project Area for the Maui cable landing site is disturbed from previous and current land use activities, and non-native plants dominate. Ten native plant species were observed within the Project Area on Maui (Table 3-8). Six of these are naturally-occurring (wild), while the remaining four native species have been planted. Three vegetation types occur: Coastal Strand, Ruderal Vegetation, and Landscaped Areas.

- Coastal Strand: This vegetation type occurs adjacent to the shoreline near the harbor breakwater and is influenced by salt spray and wind. It is dominated by non-native species that occur in patches among large open areas of sand, dirt, and rocky rubble. Common plant species in the coastal strand include low-growing ironwood, Indian fleabane, Australian saltbush, buffelgrass, silky jackbean (*Canvalia sericea*), and the native ʻākulikuli. Other native plants found in this vegetation type include pāʻū-o-Hiʻiaka, kīpūkai, naupaka kahakai, and ʻakiʻaki.
- Ruderal Vegetation: Ruderal vegetation occurs in the area between the breakwater and the parking area for the Kahului boat ramp. It is comprised of mostly non-native, low stature grasses, shrubs, and herbaceous species. Dominant plants include buffelgrass, Bermuda grass, rattlepod (*Crotalaria assamica*), creeping indigo, swollen fingergrass (*Chloris barbata*), red-flowered sida, vining cow pea (*Macroptilium atropurpureum*), and koa haole (*Leucaena leucocephala* subsp. *leucocephala*). Two native species—ʻuhaloa and pāʻū-o-Hiʻiaka—are sparsely scattered in this vegetation type.
- Landscaped Areas: The Landscaped Areas along the Kahului Beach Road ROW consist of maintained lawns of primarily Bermuda grass and buffelgrass with plantings of coconut palms

and ironwood trees into which weedy species, such as Chinese violet (*Asystasia gangetica*), have encroached.

The vegetation within the UH Maui College portion of the Project Area consists of maintained lawn of primarily Bermuda grass and buffelgrass with plantings of native and non-native ornamental species into which weedy species have intruded. Weedy species growing among and along the disturbed edges of the Landscaped Areas include khaki weed (*Alternanthera pungens*), creeping indigo, and telegraph weed (*Heterotheca grandiflora*). The native ʻuhaloa has established naturally along the disturbed edges in some areas. The native naio is planted adjacent to the Recycling and Redemption Center. The UH Maui College campus parking lot and buildings are bordered by a few plantings of coconut palm and the native pōhuehue, hau, and kou.

3.7.1.1.4 Molokai Cable Landing Site

The vegetation within the Project Area for the Molokai cable landing site is disturbed from previous and current land use activities. Only three common native plant species were observed (Table 3-8). Vegetation within the Molokai Yacht Club portion of the Project Area is classified as Pickleweed Marsh and Ruderal Vegetation; large portions of the Project Area at this site are unvegetated, with exposed bare ground. Vegetation in the Molokai Education Center portion of the Project Area is comprised of Landscaped Areas and Mixed (Cut) Non-Native Vegetation.

- Pickleweed Marsh: The Pickleweed Marsh consists of dense mats of non-native pickleweed (*Batis maritima*). No other plant species occur within this vegetation type, but red mangrove (*Rhizophora mangle*) and kiawe trees are present just to the west. This vegetation type occurs along the southwestern portion of the Project Area at Molokai Yacht Club, along the western boundary, and along the shoreline.
- Ruderal Vegetation: Ruderal Vegetation is dominated by a mixture of non-native grasses and low-growing herbaceous weeds and shrubs. This vegetation type occurs between Hio Place and the highway and in small areas around the yacht club facilities. It is comprised of patches of non-native Bermuda grass, Australian saltbush, Indian fleabane, pickleweed, fingergrass, buffelgrass, and *Sesuvium verrucosum*. Scattered individuals of the native kīpūkai are also present in this vegetation type.
- Landscaped Areas: Landscaped Areas around the Molokai Education Center are dominated by open, maintained lawns with ornamental species planted around the buildings. The lawn is mostly composed of wide-leaved carpetgrass and creeping indigo. Two native plant species, kou trees and naupaka kahakai, are planted around the buildings. Three Polynesian-introduced species—kukui trees, ti, kalo (*Colocasia esculenta*)—are also planted in the area.
- Mixed (Cut) Non-Native Vegetation: In the western side of the Project Area at Molokai Education Center, a mixture of recently-cut non-native plants species are present. Non-native species identified in this area include buffelgrass, koa hoale, kiawe, Guinea grass, spiny amaranth (*Amaranthus spinosus*), sourgrass (*Digitaria insularis*), sourbush, Australian

saltbush, and scarlet boerhavia (*Boerhavia coccinea*). The native kīpūkai is also scattered throughout the cut vegetation.

3.7.1.1.5 Lānaʻi Cable Landing Site

The Lānaʻi cable landing site is dominated by plants non-native to the Hawaiian Islands. Five native plant species were observed within the Project Area (Table 3-8), all of which are indigenous to and common throughout the Hawaiian Islands. Two vegetation types occur: Landscaped Areas and Kiawe/ Buffelgrass Forest.

- Landscaped Areas: This vegetation type occurs in the northern and central portions of the Project Area along the road edges and around the harbor infrastructure. Landscaping consists of maintained lawn of primarily wide-leaved carpetgrass and Hilo grass, and plantings of non-native ornamental plants bordering the lawn into which weedy species have intruded. Planted species include Swiss-cheese plant (*Monstera deliciosa*), monkeypod (*Samanea saman*), and Manila palm (*Veitchia merrillii*). Weedy species growing in the landscaped areas include swollen fingergrass (*Chloris barbata*), Carolina love grass, and Oriental hawksbeard (*Youngia japonica*). Native species planted within this vegetation type are few but include kou, milo, pōhinahina, and pōhuehue. Scattered individuals of the native ʻuhaloa and hoary abutilon (*Abutilon incanum*) grow naturally along the disturbed edges of this vegetation type.
- Kiawe/ Buffelgrass Forest: This vegetation type occurs as a relatively narrow band along the southern margin of the Project Area. It is dominated by moderately open to dense stands of kiawe trees with an understory of sparse to moderately dense patches of buffelgrass. Non-native weedy plants include golden crown-beard (*Verbesina encelioides*), spiny amaranth, obscure morning glory, bitter melon, and yellow wood sorrel (*Oxalis corniculata*). The native ʻuhaloa occurs rarely, and hoary abutilon is moderately common.

3.7.1.1.6 Hawaiʻi Island Cable Landing Site

The vegetation with the Project Area for the cable landing site on Hawaiʻi Island is disturbed from previous and current land use activities. Only two native plant species were observed (Table 3-8), both of which commonly occur throughout the Hawaiian Islands. Vegetation within the PACRC portion of the Project Area is classified as Landscaped Areas and Coastal Strand, and the UH Hilo portion is comprised entirely of Landscaped Areas.

- Landscaped Areas: This vegetation type dominates the PACRC portion of the Project Area and is characterized by maintained lawn dominated by Hilo grass, with ornamental plantings around buildings, roads, and fenceline edges and agricultural crops planted in discrete areas. Weedy species occurring along the lawn edges include Guinea grass, tick clover (*Grona triflora*), and *Spermacoce exilis*. Plantings of ornamental herbs, shrubs, and small trees include wedelia, fiddlewood (*Citharexylum caudatum*), and the Polynesian-introduced tī. Cultivated agricultural crops are growing in small, discrete areas in the southern portion of the Project Area at PACRC such as kalo, sugar cane (*Saccharum officinarum*), and cassava (*Manihot esculenta*). False kamani (*Terminalia catappa*) trees and coconut palms occur near the shoreline. The indigenous sedge *Cyperus polystachyos* occurs infrequently within this vegetation type.

Within the UH Hilo portion of the Project Area, the landscaped areas consist of maintained lawns with various planted ornamental shrubs and large trees. The lawns are dominated by wide-leaved carpetgrass and Hilo grass. Trees planted in the area include coconut palm, octopus tree (*Schefflera actinophylla*), African tulip (*Spathodea campanulata*), autograph tree, *Tabebuia heterophylla*, and paperbark (*Melaleuca quinquenervia*). Weedy plants growing within and on the edges of landscaping include silver fern (*Pityrogramma calomelanos*), artillery plant (*Pilea microphylla*), milkwort (*Polygala paniculata*), maile honohono (*Ageratum conyzoides*), oriental hawksbeard, maile pilau, and bearded begonia (*Begonia hirtella*). No native plant species were observed within the UH Hilo portion of the Project Area.

- Coastal Strand: This vegetation type occurs in small patches of sandy soil in the area between the lawn and rocky shoreline within the PACRC portion of the Project Area. Species within this vegetation type are few and comprised of the native naupaka kahakai, as well as non-native coconut palms and false kamani trees.

3.7.1.2 Wildlife

The majority of the wildlife recorded within the overall Project Area for the cable landing sites are non-native to the Hawaiian Islands. In total, nine native bird species were recorded, including migratory birds that occur naturally but do not breed in the Hawaiian Islands (Table 3-9). These migratory species are protected by the Migratory Bird Treaty Act (MBTA). Federally and state listed bird species recorded within the cable landing sites or with the potential to occur or traverse the cable landing sites are discussed in Section 3.7.1.3. Six non-native mammal species were detected during the surveys. Hawai'i's only native extant land mammal, the Hawaiian hoary bat, is discussed in Section 3.7.1.3 Only two native terrestrial invertebrate species, the globe skimmer (*Pantala flavescens*) and green darner (*Anax junius*), were recorded within the Project Area for the cable landing sites. A brief description of the wildlife recorded at each cable landing site is provided below. Listed wildlife species with the potential to occur or traverse the cable landing sites are discussed in Section 3.7.1.3.

Table 3-9. Native Bird Species Recorded within the Cable Landing Sites and Immediate Vicinity

Common/ Hawaiian Name(s)	Scientific Name	Status	Cable Landing Site					
			Kaua'i	O'ahu	Molokai	Lāna'i	Maui	Hawai'i Island
Black-crowned night heron / auku'u	*Nycticorax nycticorax*	I			●			●
Great frigatebird / 'iwa	*Fregata minor*	I				●	●	
Hawaiian common gallinule / 'alae 'ula	*Gallinula galeata sandvicensis*[1/]	E	●					
Hawaiian duck / koloa maoli	*Anas wyvilliana*[1/]	E	●					
Hawaiian goose / nēnē	*Branta sandvicensis*[2/]	E	●					
Hawaiian stilt / ae'o	*Himantopus mexicanus knudseni*[1/]	E	●		●			
Pacific golden-plover / kōlea	*Pluvialis fulva*	M	●	●	●			●
Ruddy turnstone / 'akekeke	*Arenaria interpres*	M	●	●	●			●
Wandering tattler / 'ūlili	*Tringa incana*	M		●				●

Status: I = Indigenous, E = Endemic, M = Migrant
1/ Listed as federally and state endangered.
2/ Listed as federally threatened and state endangered.

3.7.1.2.1 Kauaʻi Cable Landing Site

Twenty bird species were recorded in the Project Area for the Kauaʻi cable landing site and immediate vicinity during the surveys. Two federally and state listed bird species—the Hawaiian duck/ koloa maoli (*Anas wyvilliana*) and the Hawaiian common gallinule/ ʻalae ʻula (*Gallinula galeata sandvicensis*)—were observed within the Nukoliʻi Beach Park portion of the Project Area. Two additional federally and state listed bird species—the Hawaiian stilt/ aeʻo (*Himantopus mexicanus knudseni*) and Hawaiian goose/ nēnē (*Branta sandvicensis*)—were observed using habitat in the area immediately adjacent. Listed birds with the potential to occasionally occur in or traverse the cable landing site are discussed in Section 3.7.1.3 below. Two native migratory bird species were observed within the Project Area at Nukoliʻi Beach Park —Pacific golden-plover/ kōlea (*Pluvialis fulva*) and ruddy turnstone/ ʻakekeke (*Arenaria interpres*). The remaining bird species recorded are non-native to the Hawaiian Islands. The most common bird species recorded during the surveys for the Kauaʻi cable landing site were the common myna (*Acridotheres tristis*), Pacific golden plover, and chestnut munia (*Lonchura atricapilla*).

Two non-native terrestrial mammalian species were detected in the Project Area. Feral pig (*sus scrofa*) evidence and off-leash domestic dogs (*Canis familiaris*) were seen. Although not observed during the surveys, other introduced mammals such as rats (*Rattus* spp.) and feral cats (*Felix catus*) are also likely to occur.

Most of the invertebrates observed during the surveys are non-native to the Hawaiian Islands including the carpenter bee (*Xylocopa sonorina*), giant African snail (*Achatina fulica*), and Western honeybee (*Apis mellifera*). Two native dragonfly species, the globe skimmer and green darner, were also recorded. Along the shoreline, shore flies (Ephydridae) were abundant within the Project Area.

3.7.1.2.2 Oʻahu Cable Landing Site

Fifteen bird species were recorded in the Project Area for the Oʻahu cable landing site and immediate vicinity during the survey. All of the bird recorded species recorded are either non-native or migrants to the Hawaiian Islands and are species commonly found on Oʻahu. The most common bird species recorded during the survey were common waxbill (*Estrilda astrild*), common myna, and African silverbill (*Euodice cantans*). Three native shorebird migrants were recorded—Pacific golden-plover, ruddy turnstone, and wandering tattler/ ʻūlili (*Tringa incana*). Although no federally or state listed bird species were recorded, several listed bird species have the potential to occasionally be present in or traverse the cable landfall, as discussed in Section 3.7.1.3 below.

Two non-native terrestrial mammalian species were detected in the area during the survey. A feral cat and an off-leash dog were observed. Rats, small Indian mongoose (*Herpestes auropunctatus*), and house mice (*Mus musculus*) are also likely to occur.

Most of invertebrates observed during the surveys are non-native to the Hawaiian Islands including large orange sulphur (*Phoebis agarithe*), Western pygmy blue (*Brephidium exilis*), and Rambur's forktail (*Ischnura ramburii*). The native globe skimmer and green darner were recorded. Damage from the invasive coconut rhinoceros beetle (*Oryctes rhinoceros*) was observed on two coconut palms within the beach park; this species is now widespread on Oʻahu (CRBRH 2024).

3.7.1.2.3 Maui Cable Landing Site

Twelve bird species were recorded within the Project Area for the Maui cable landing site during the surveys. One native bird species, the great frigatebird, was observed flying over the landing site. The remainder of the bird species recorded are non-native to the Hawaiian Islands and are commonly found in urban areas. The most common species recorded during the surveys were rock pigeon (*Columba livia*), common myna, and zebra dove (*Geopelia striata*). Although not observed during the surveys, it is possible that other MBTA-protected species such as wedge-tailed shearwater/ ʻuau kani (*Ardenna pacifica*), wandering tattler, Pacific golden-plover, and ruddy turnstone could also occasionally occur in or transit the Project Area.

Three non-native terrestrial mammalian species were detected in the area during the surveys: small Indian mongoose, dogs, and feral cats. Although not directly observed, other introduced mammals, such as house mice and rats are likely to occur.

Most of the large and conspicuous invertebrates observed during the surveys are non-native to the Hawaiian Islands including flies, Western honeybee, Oriental flower beetle (*Protaetia orientalis*), and pea blue (*Lampides boeticus*). Only one native terrestrial invertebrate species, the globe skimmer, was recorded within the Project Area for the Maui cable landing site.

3.7.1.2.4 Molokai Cable Landing Site

Thirteen bird species were recorded within the Project Area for the Molokai cable landing site. The federally and state endangered Hawaiian stilt was observed flying through the Molokai Yacht Club portion of the Project Area during the survey. Listed bird species are discussed in further detail in Section 3.7.1.3 below. Three additional native bird species were also recorded within this site —black-crowned night heron/ aukuʻu (*Nycticorax nycticorax*), Pacific golden plover, and ruddy turnstone. Although not observed during the surveys for this Project, the native bristle-thighed curlew/ kioea (*Numenius tahitiensis*) has been previously reported to use the parking lot and lawn in the vicinity of the Molokai Education Center (PBR Hawaiʻi 2020). The remaining nine bird species recorded during the survey are non-native and commonly found in urban, rural, or agricultural areas. The most common bird species recorded during the survey were the zebra dove, cattle egret (*Bubulcus ibis*), and common myna.

Several dogs were seen in the Molokai Yacht Club portion of the Project Area and the scat and tracks of feral cats were also identified. A feral cat was seen in the Molokai Education Center portion of the Project Area. Although not directly observed, other introduced mammals, such as small Indian mongoose, feral pigs, house mice, and rats are likely to occur.

Ants (Formicidae), pill bugs (Isopoda), and a garden spider (*Argiope appensa*) were recorded within the Project Area for the Molokai cable landing site. These taxa are all non-native to the Hawaiian Islands; no native terrestrial invertebrates were observed.

3.7.1.2.5 Lānaʻi Cable Landing Site

Ten bird species were recorded in the Project Area for the Lānaʻi cable landing site and immediate vicinity during the survey. All of these bird species are non-native to the Hawaiian Islands with the exception of the great frigatebird/ ʻiwa (*Fregata minor*). The most common bird species recorded

during the survey were Gambel's quail (*Callipepla gambelii*), common myna, and gray francolin (*Ortygornis pondicerianus*). Although not observed during the survey, it is possible that other MBTA-protected species such as wedge-tailed shearwater, wandering tattler, and Pacific golden-plover could also occasionally occur in or transit the Project Area for the Lāna'i cable landing site.

Two non-native terrestrial mammalian species were detected during the surveys. Axis deer (*Axis axis*) tracks and scat were seen, and a house mouse was also observed. Although not observed during the surveys, other introduced mammals, such as rats, feral cats, small Indian mongoose, and dogs are likely to occur. Predator control traps and cameras were observed just south of the Project Area indicating non-native mammals may be present in the area.

Most of the terrestrial invertebrates observed during the surveys are non-native to the Hawaiian Islands including geometrid caterpillar (Geometridae), leaf cutter bee (Megachilidae), wasps (Vespidae), and Western honeybees. Only one native terrestrial invertebrate species, the globe skimmer, was recorded within the Project Area.

3.7.1.2.6 Hawai'i Island Cable Landing Site

Twenty bird species were recorded in the Project Area for the Hawai'i Island cable landing site and immediate vicinity during the surveys. Of these, four species—the black-crowned night heron, ruddy turnstone, Pacific golden-plover, and wandering tattler—are native to the Hawaiian Islands and are protected by the MBTA. The remaining species are non-native and commonly found in urban, rural, or agricultural areas. The most common bird species recorded during the surveys were the warbling white eye (*Zosterops japonicus*), saffron finch (*Sicalis flaveola*), and common myna. Although no federally or state listed bird species were recorded, several have the potential to occasionally be present in or traverse the Project Area, as discussed in Section 3.7.1.3 below.

Small Indian mongoose and feral cats were seen during the surveys. Although not directly observed, other introduced mammals, such as house mice, rats, and dogs are also likely to occur within the Project Area.

Terrestrial invertebrates observed within the Project Area for the Hawai'i Island cable landing site are non-native to the Hawaiian Islands and include ants, wasps, grasshoppers (*Oedaleus* sp.), and pill bugs; no native terrestrial invertebrates were documented. Shore flies (Ephydridae) were abundant within the PACRC portion of the Project Area.

3.7.1.3 Threatened and Endangered Species

Although the majority of the plants and animals recorded in the Project Area for the various cable landing sites are not native to the Hawaiian Islands, several listed species were recorded during the biological surveys. Additionally, several federally or state listed species that were not observed during the biological surveys have the potential to occur within or traverse over the cable landing sites. Listed species with the potential to occur in the Project Area are summarized in Table 3-10Table 3-10 and discussed in further detail below. Endangered Hawaiian monk seals and threatened green sea turtles may occasionally occur along the shoreline area at some of the cable landing sites; these marine species are discussed in Section 3.6.

Table 3-10. Federally or State Listed Terrestrial Species with Potential to Occur in Project Area

Common/ Hawaiian Name(s)	Scientific Name	Status[1/]	Cable Landing Site					
			Kauaʻi	Oʻahu	Molokai	Lānaʻi	Maui	Hawaiʻi Island
Waterbirds								
Hawaiian common gallinule/ ʻalae ʻula	*Gallinula galeata sandvicensis*	SE, FE	●	●				
Hawaiian coot/ ʻalae keʻo keʻo	*Fulica alai*	SE, FE	●	●	●	●	●	●
Hawaiian duck/ koloa	*Anas wyvilliana*	SE, FE	●					
Hawaiian goose/ nēnē	*Branta sandvicensis*	SE, FT	●					●
Hawaiian stilt/ aeʻo	*Himantopus mexicanus knudseni*	SE, FE	●	●	●	●	●	●
Seabirds								
Band-rumped storm-petrel/ ʻakēʻakē	*Hydrobates castro*	SE, FE	●	●	●	●	●	●
Hawaiian petrel/ ʻuaʻu	*Pterodroma sandwichensis*	SE, FE	●	●	●	●	●	●
Newell's shearwater/ ʻaʻo	*Puffinus auricularis newelli*	ST, FT	●	●	●	●	●	●
Raptors								
Hawaiian hawk/ ʻio	*Buteo solitarius*	SE						●
Hawaiian short-eared owl/ pueo	*Asio flammeus sandwichensis*	SE[2/]		●				
Mammals[3/]								
Hawaiian hoary bat/ ʻōpeʻapeʻa	*Lasiurus semotus*	SE, FE	●	●	●	●	●	●

1/ FE = federally endangered; SE = state endangered; FT = federally threatened; ST = state threatened
2/ Hawaiian short-eared owls could occur at other sites, but this species is only state listed on Oʻahu.
3/ Endangered Hawaiian monk seals and threatened green sea turtles could occur along the shoreline area at some of the cable landing sites; see Section 3.6.

No designated or proposed critical habitat for terrestrial species exists within the cable landing sites.[18] Plant critical habitat Coastal—Unit 14 is located 80 feet west of the Project Area for the Oʻahu cable landfall (Figure 13.2). Coastal—Unit 14 was occupied by the endangered *Achyranthes splendens* var. *splendens* at the time of designation and is considered unoccupied critical habitat for an additional six listed plant species (USFWS 2012). None of these listed plants occur within the Project Area for the Oʻahu cable landfall.

3.7.1.3.1 Loulu

Three individuals of the endemic and endangered loulu palm (*Pritchardia napaliensis*) are planted in the Project Area for the Kauaʻi CLS, northwest of the KCC Learning Resource Center. *Pritchardia napaliensis* only occurs on the island of Kauaʻi. This species typically grows in areas of elevation between 500 and 3,800 feet in habitats ranging from lowland dry to diverse mesic forests (USFWS 2003). No naturally occurring *P. napaliensis* are present in the Project Area.

[18] Designated critical habitat for the Hawaiian monk seal and proposed critical habitat for the threatened green sea turtle, both of which include terrestrial components, are discussed in Section 3.6.

3.7.1.3.2 Listed Waterbirds

The following four endangered species comprise the Hawaiian listed waterbirds: Hawaiian stilt, Hawaiian common gallinule, Hawaiian coot/ ʻalea keʻokeʻo (*Fulica alai*), and Hawaiian duck. Hawaiian coots and stilts occur on all the main Hawaiian Islands. The Hawaiian common gallinule is currently restricted to the islands of Oʻahu and Kauaʻi, and purebred Hawaiian ducks currently only occur on Kauaʻi (Pacific Birds 2024). The four listed waterbirds inhabit a variety of coastal aquatic habitats including wetlands, marshes, streams, ditches, ponds, flooded agricultural fields, reservoirs, fishponds, and man-made impoundments (USFWS 2011, Bannor and Kiviat 2020, Engilis et al. 2020, Pratt and Brisbin 2020, Uyehara et al. 2008). Hawaiian stilts may also opportunistically use mudflats, areas with ephemeral standing water, or grassy lawns and upland fields (Kawasaki et al. 2019, Robinson et. al 2020). Specific foraging and nesting characteristics vary slightly by species; additional details are provided in the Biological Resources Survey Reports (see Appendix G).

Hawaiian Common Gallinules: Hawaiian common gallinules were recorded within and immediately adjacent to the Project Area at Nukoliʻi Beach Park during the biological surveys. A pair of gallinules with three juveniles were observed in the ditch water along Kauaʻi Beach Road. Additional gallinule adults were observed along the ditch slope north of Kauaʻi Beach Drive. Adult Hawaiian common gallinule were observed foraging along the western side of Kauaʻi Beach Road within the grassy ROW. Thus, Hawaiian common gallinules are likely to regularly use the ditch immediately adjacent to the Kauaʻi cable landfall. Although no suitable nesting habitat is present within the Project Area at Nukoliʻi Beach Park, nesting may occur in the immediate vicinity.

No suitable habitat for the Hawaiian common gallinule is present within the Project Area for the Oʻahu cable landfall; however, it is possible this species could occasionally use the surface water in the canal located just east of Barbers Point Beach Park or could fly over the cable landfall while traveling to nearby suitable habitat.

Hawaiian Stilts: At least three Hawaiian stilt individuals were observed loafing in the wetland immediately west of the Project Area at Molokai Yacht Club. Two stilts flew overhead, vocalizing and displaying territorial behavior. Therefore, it is likely stilts could regularly forage and possibly nest at the wetland within or adjacent to the Project Area at this site. Hawaiian stilts were also observed foraging and loafing in grassy lawns adjacent to the Project Area at both the Kauaʻi and Maui cable landfalls. Although this species' preferred habitat is only present within the Project Area at the Molokai and Kauaʻi cable landfalls, it could occasionally use grassy lawns or ephemeral standing water within any of the cable landing sites.

Hawaiian Coots: No Hawaiian coots were observed during the surveys of the cable landing sites. However, Hawaiian coots could occur or nest in the ditch adjacent to the Project Area at Nukoliʻi Beach Park, and this species could occasionally occur at the wetland within the Project Area at Molokai Yacht Club. Although its preferred habitats (e.g., wetlands, streams, ponds, mudflats, reservoirs) are not present in the Project Area for the Oʻahu, Lānaʻi, Maui, and Hawaiʻi Island cable landing sites, this species has been recorded in the vicinity of these sites (eBird 2021), and therefore could fly over the cable landing sites while traveling to areas with suitable habitat.

Hawaiian Ducks: Two Hawaiian ducks (assumed to be pure, not hybrids) were observed flying over the Project Area at Nukoli‘i Beach Park during the biological surveys. Hawaiian ducks have previously been recorded at the beach park and along Kaua‘i Beach Road (eBird 2021) and could forage and loaf in the adjacent ditch. On Kaua‘i, nesting has been reported along streams and ditches (Engilis et al. 2020); thus, although no suitable nesting habitat is present within the Project Area at Nukoli‘i Beach Park, nesting may occur in the immediate vicinity.

3.7.1.3.3 Hawaiian Goose/ Nēnē

The Hawaiian goose/ nēnē (*Branta sandvicensis*) uses various habitat types ranging from coastal to subalpine environments, including shrublands, grasslands, beach strand, and lava rock (Banko et al. 2020). They are known to use golf courses, grazed agricultural areas, playing fields, and lawns. Although they are not obligate waterbirds, nēnē also use wetlands, reservoirs, and streams, and often migrate seasonally between high-elevation shrublands during the non-breeding season to lower-elevation breeding and molting areas (Hess et al. 2012). Nesting occurs in a variety of habitats, but typically nests are well concealed under shrubs (Banko et al. 2020).

The Hawaiian goose has the potential to occur within the Project Area at two of the cable landing sites — Kaua‘i and Hilo. On Kaua‘i, two nēnē were observed grazing immediately adjacent to the Project Area near Kaua‘i Beach Drive. A family of four nēnē were also observed grazing along the western slope of the ditch immediately north of Kaua‘i Beach Drive. Nēnē have also been recorded at the beach park and along Kaua‘i Beach Road (eBird 2021). Although no nēnē were observed in the Project Area for the Kaua‘i CLS during the surveys, nēnē have been recorded transiting the KCC campus (Wilson Okamoto Corporation 2011, eBird 2021). Nēnē were not observed during the surveys at the Hilo cable landing site; however, nēnē have been recorded nearby in Keaukaha (eBird 2021) and may fly over or occasionally visit the PACRC portion of the Project Area to forage on mowed grass or visit the aquaculture tanks.

3.7.1.3.4 Listed Seabirds

The endangered Hawaiian petrel/ ‘ua‘u (*Pterodroma sandwichensis*), threatened Newell’s shearwater/ ‘a‘o (*Puffinus newelli*), and endangered band-rumped storm-petrel/ ‘akē‘akē (*Hydrobates castro*) (collectively referred to as listed seabirds) have not been documented at any of the cable landing sites, and suitable nesting habitat does not occur within any portion of the Project Area. However, these listed seabirds may fly over the cable landing sites at night during the breeding, nesting, and fledging seasons (March 1 to December 15) while transiting between higher elevation breeding colonies and the ocean. These listed birds spend most of their lives at sea and rarely return to land outside of the breeding season. These listed seabirds are known to be attracted to outdoor lighting at night; after circling the lights, they can become exhausted and collide with nearby structures or fall to the ground (USFWS 2023). Offshore, these three listed seabirds have the potential to fly over the cable ship and/or support vessels during HDD and subsea cable installation activities.

3.7.1.3.5 Hawaiian Hawk/ ‘Io

The state listed Hawaiian hawk is the only native hawk in the Hawaiian Islands and is currently restricted to the Island of Hawai‘i. It occurs at elevations from sea level up to 6,500 feet. This raptor nests in large trees, primarily the native ‘ōhi‘a (*Metrosideros polymorpha*), between March and the end

of September. Hawaiian hawks are non-migratory and defend their territory year-round (Clarkson and Laniawe 2020). Although no Hawaiian hawks or their nests were observed during the surveys, this species has previously been observed on the UH Hilo campus (eBird 2021) and could occur within the Project Area for the Hilo CLS. While the large trees within the Project Area could provide suitable nesting sites, the UH Hilo campus is not ideal for the Hawaiian hawk due to the prevalence of feral cats in the area.

3.7.1.3.6 Hawaiian Short-Eared Owl/ Pueo

The culturally significant Hawaiian short-eared owl/ pueo (*Asio flammeus sandwichensis*) is listed by the State of Hawai‘i as endangered on O‘ahu, but it is not listed on the other islands and is not federally listed under the ESA. Pueo are found on all the main Hawaiian Islands, at elevations ranging from sea level to 8,000 feet. On O‘ahu, they occupy a variety of habitats, including agricultural lands, grasslands, wetlands, shrublands, and native forests. It is suggested their habitat use may be influenced by food availability. Nests are made of scrapes in the ground lined with grasses and feather down (Cotín et al. 2018, Price and Cotín 2018, Wiggins et al. 2020).

Pueo were not seen at any of the cable landing sites; however, neither evening nor early morning surveys were conducted. Pueo have been observed in the general vicinity of the O‘ahu cable landfall (Price and Cotín 2018, eBird 2021). Given their occurrence in the vicinity and use of various habitats, it is possible pueo could traverse or occasionally forage in the vicinity of the O‘ahu cable landfall; however, it is unlikely pueo would nest within the Project Area given the lack of suitable nesting habitat and human presence.

3.7.1.3.7 Hawaiian Hoary Bat/ ‘Ōpe‘ape‘a

The Hawaiian hoary bat is the only extant native terrestrial mammal present in the Hawaiian Islands. Recent studies and ongoing research have shown bats to be more abundant across the Hawaiian Islands than previously understood (Gorresen et al. 2013, Bonaccorso et al. 2015, USGS 2019b). This species will forage in open and semi-cluttered landscapes in a wide range of habitats and vegetation types, such as in open areas, at forest edges or within gaps, and over open bodies of water including streams, ponds, and along shorelines (Jacobs 1994, Jacobs 1999, Bonaccorso et al. 2015, Pinzari et al. 2019). Hawaiian hoary bats are tree-roosting bats and roost in various native and non-native trees (USFWS 1998, Gorresen et al. 2013, Montoya-Aiona et al. 2023).

Focused surveys for ‘ōpe‘ape‘a using ultrasonic acoustic bat recorders or night vision goggles were not conducted for the Project. Given the species’ wide range of foraging habitat, it is likely that Hawaiian hoary bats forage in or near the Project Area for several, if not all, of the cable landing sites. Many of the trees within the Project Area for the various cable landing sites are over 15 feet tall and have the potential to function as bat roost trees, per USFWS (2023) and the State of Hawai‘i Division of Forestry and Wildlife (DOFAW; DOFAW 2015). Thus, Hawaiian hoary bats may transit, roost, or forage in portions of the Project Area.

3.7.2 Potential Impacts and Mitigation Measures

3.7.2.1 Vegetation

Direct impacts to vegetation would occur as a result of clearing and ground disturbance during construction. However, as described above, the vegetation within the Project Area at each cable landing site has been extensively disturbed, with existing vegetation largely comprised of non-native species. The native plant species that occur within the Project Area (see Table 3-8) are common throughout the Hawaiian Islands. Removal of any of the native plant species identified in the Project Area is not anticipated to adversely impact local or regional populations as these native species are known to have widespread distribution throughout the state. The Project is not expected to impact the endangered loulu planted within the Project Area at KCC, as further discussed in Section 3.7.2.3.

Following construction, all temporarily disturbed areas would be revegetated to stabilize soil and prevent erosion; as described in Section 2.5.5, it is anticipated that revegetation would involve application of hydroseeding using a suitable mix of non-invasive grass species and/or species already found at each of the sites. If landscaping is installed as part of the Project, native plant species would be incorporated to the extent practicable.

Ground disturbance as well as the movement of construction and operation equipment and personnel in the Project Area could also indirectly impact vegetation by facilitating the introduction or spread of invasive species. Although non-native weedy species are common in the Project Area for each of the cable landing sites, invasive species minimization measures would be implemented to avoid unintentional introduction or transport of new invasive species to the area, as described in Section 3.7.3.

Following construction, little to no ground disturbance is anticipated as part of Project operations. Vegetation within the Project Area at each cable landing site would continue to be managed or maintained in a similar fashion to the existing condition (e.g., routine mowing of lawns).

As the Project Area is dominated by disturbed, non-native vegetation, few native plant species would be removed, and measures would be implemented to minimize the introduction and spread of invasive species, implementation of the Project is not expected to have more than a short-term, minor impact on vegetation within the Project Area.

3.7.2.2 Wildlife

Project construction could directly and/or indirectly affect terrestrial wildlife. As previously described, the presence of native wildlife and suitable habitat for native wildlife has been diminished by previous disturbances throughout the Project Area for the various cable landing sites. The majority of the terrestrial wildlife observed during the biological surveys are non-native to the Hawaiian Islands. However, several threatened and endangered wildlife species are known to occur or could potentially occur within or traverse over the Project Area. Potential impacts and associated mitigation measures specific to listed wildlife species are discussed in Section 3.7.2.3.

Direct impacts to wildlife could occur during construction as a result of collision with vehicles and equipment. The Project also would generate short-term, intermittent increases in noise and human

activity within and near the Project Area during construction, which could result in temporary disturbance or displacement of wildlife in the area. However, construction would occur over a relatively short period, during which time, it is expected that wildlife would exhibit avoidance behavior and temporarily relocate to surrounding areas.

Over the long-term, the Project would comprise a very limited amount of above-ground infrastructure and thus would not result in substantial habitat loss. Once operational, Project-related activity and noise levels would generally be limited to occasional maintenance activities. Any potential impacts to wildlife as a result of invasive species would be minimized through implementation of the avoidance and minimization measures described below (Section 3.7.3). As such, potential impacts to terrestrial wildlife species are expected to be short-term and minor.

3.7.2.3 Federally and State Listed Species

As described in Section 3.7.1.3, several federally and state listed wildlife species were either observed or documented, or could potentially occur within or traverse over the Project Area for the various cable landing sites. This section discusses potential impacts to each of these species; a comprehensive list of the mitigation measures that would be implemented to avoid and minimize impacts is provided in Section 3.7.3. The list of mitigation measures incorporates recommendations provided by USFWS and DOFAW regarding potential species occurrence and measures to avoid and minimize impacts to those species; copies of the correspondence from USFWS and DOFAW are contained in Appendix J.

3.7.2.3.1 Loulu

Although the loulu palms (*Pritchardia napaliensis*) planted on the KCC campus are not naturally occurring (wild), the Project has been designed to avoid these plants. In order to avoid unintentional impacts to the palms, an appropriate buffer would be established to prevent disturbance to the plants, as described in Section 3.7.3. Therefore, no adverse effects to this species are anticipated.

3.7.2.3.2 Listed Waterbirds

As stated in Section 3.7.1.3, the four listed waterbird species have the potential to occur within or fly over the Project Area for the cable landing sites. In particular, Hawaiian common gallinules are likely to regularly use the ditch immediately adjacent to the Kaua‘i cable landfall, and Hawaiian stilts are expected to regularly occur at the wetlands within or adjacent to the Molokai cable landfall. Potential direct impacts to listed waterbirds could occur as a result of collision with vehicles and equipment. However, such impacts are unlikely with implementation of the avoidance and minimization measures listed in Section 3.7.3, including buffer restrictions, pre-construction surveys, and staff training. The Project may also cause temporary disturbance to listed waterbirds due to localized noise and disturbance associated with construction. This potential impact would be intermittent and temporary, with waterbirds expected to exhibit avoidance behavior by temporarily relocating to nearby areas. With the implementation of the avoidance and minimization measures listed in Section 3.7.3, construction-related effects on listed waterbirds are anticipated to be short-term and minor.

Once operational, the Project is not expected to result in any long-term, adverse impacts to listed waterbirds because no preferred habitat (e.g., standing water) would be removed as a result of the

Project. Following construction, noise and disturbance would generally be limited to occasional maintenance activities, and operations staff would be trained to avoid any potential impacts on listed species (see Section 3.7.3). Therefore, operational effects on listed waterbirds would be negligible.

3.7.2.3.3 Hawaiian Goose/ Nēnē

As stated above, the Hawaiian goose has the potential to occur within the Project Area at the Kaua‘i and Hawai‘i Island cable landing sites. Similar to the listed waterbirds, potential Project-related impacts to the Hawaiian goose include collision with vehicles and equipment during construction and temporary disturbance due to localized noise and increased activity. These potential impacts would be intermittent and temporary, and further minimized through the implementation of the measures listed in Section 3.7.3 including buffer restrictions, pre-construction surveys, and staff training.

Once operational, the Project is not expected to result in any long-term, adverse impacts to the Hawaiian goose. Any suitable habitat (e.g., grasslands) disturbed by the Project would be revegetated following construction to stabilize soil and prevent erosion. Following construction, noise and disturbance would generally be limited to occasional maintenance activities, and operations staff would be trained to avoid any potential impacts on listed species (see Section 3.7.3). Therefore, operational effects on listed waterbirds would be negligible.

3.7.2.3.4 Listed Seabirds

It is possible that the three listed seabird species could fly over the subsea cable route during cable installation or landing operations. Although unlikely, it is also possible they could fly over the cable landing sites while transiting between the ocean and upland breeding sites during the breeding, nesting, and fledging seasons (March 1 to December 15). Seabirds are attracted to lights, which can cause disorientation. The use of outdoor lighting for nighttime construction or operations could result in seabird disorientation, causing them to collide with structures. Juvenile seabirds are especially vulnerable to light attraction during the seabird fledgling period (September 15 through December 15); the birds can become exhausted from circling the light sources, and once grounded, are vulnerable to mammalian predators, starvation, or vehicle collisions (Banko et al. 1991, Ainley et al. 2001, Rodríguez et al. 2017, USFWS 2023). Measures to avoid and minimize the potential impacts from artificial night lights would be implemented as part of Project construction, as described in Section 3.7.3. For example, nighttime construction lighting at the cable landing sites would be avoided during the seabird fledging period (September 15 through December 15).

No new permanent nighttime lighting is proposed as part of the Project. Additionally, no new overhead utility lines would be constructed as part of the Project; all new infrastructure would be placed in underground conduit, thereby minimizing risk of collision.[19] With the implementation of the avoidance and minimization measures identified below, effects on listed seabirds would be insignificant.

[19] As described in Section 2.1, the Project would utilize fiber on each island’s existing utility system; overhead fiber used by the Project would comprise existing infrastructure that is owned and operated by a licensed utility.

3.7.2.3.5 Hawaiian Hawk/ ʻIo

The state listed Hawaiian hawk could occur in or around the Project Area for the Hawaiʻi Island CLS at UH Hilo. The Project could temporarily disturb or displace Hawaiian hawks in the area due to noise associated with construction; however, these localized impacts would be temporary and intermittent, and hawks are expected to relocate to suitable habitat in surrounding areas. If a Hawaiian hawk is observed during active construction, all work within 100 feet of the bird would cease and would only resume after the bird voluntarily leaves the area. The potential long-term impacts associated with permanent habitat loss is expected to be negligible given relatively limited suitability of habitat within the Project Area and the small amount of habitat that would be removed.

3.7.2.3.6 Hawaiian Short-Eared Owl/ Pueo

As stated above, pueo could traverse or occasionally forage in the Project Area for the various cable landing sites, including on Oʻahu where the species is state listed. In the unlikely event that pueo occur within the Project Area during construction, activities could impact the species through temporary disturbance. This potential impact would be intermittent and temporary, as disturbed birds would be expected to exhibit avoidance behavior and relocate to nearby areas. Prior to construction, staff would be trained to identify listed wildlife (including pueo on Oʻahu) and to take appropriate steps if encountered, including stopping work within the immediate vicinity of listed species. Potential impacts of the Project on pueo are expected to be negligible.

3.7.2.3.7 Hawaiian Hoary Bat/ ʻŌpeʻapeʻa

Based on the existing habitat, Hawaiian hoary bats could transit, roost, or forage in portions of the Project Area. Trees suitable for bat roosting (i.e. those greater than 15 feet in height) occur within the Project Area at all of the cable landing sites, and several of these trees may be disturbed or removed as part of the Project. However, no direct impacts would occur to roosting bats or their young because no tree trimming or disturbance for the Project would occur during the birthing and pupping season (June 1 through September 15), when there is a risk that juvenile bats that cannot yet fly on their own could inadvertently be harmed or killed.

Indirect impacts could include temporary displacement and/or permanent loss of foraging and roosting habitat. However, since construction activities would generally occur during daylight hours when bats are not typically foraging, the likelihood of disturbance would be minimal. Non-reproductive bats generally use multiple roosts within an area and are expected to relocate if disturbed (Montoya-Aiona et al. 2023).

Given the relatively limited roosting and foraging habitat within the Project Area, the small amount of habitat to be removed, and the extent of suitable roosting and foraging habitat available in the vicinity, the potential for long-term impacts associated with permanent habitat loss is expected to be minimal. Additionally, no barbed wire would be used on fencing to prevent entanglement. Once operational, the Project would not include any activities that would be expected to disturb or otherwise impact Hawaiian hoary bats. With the implementation of avoidance and minimization measures outlined in Section 3.7.3, effects on the Hawaiian hoary bat would be minor.

3.7.3 Impact Avoidance and Minimization Measures

Consistent with recommendations provided by USFWS and DOFAW, the measures listed below would be implemented to avoid and minimize potential Project-related impacts to terrestrial biological resources. With implementation of these measures, the Project would not be expected to result in significant adverse impacts to plants or wildlife, including federally and state listed species. If circumstances arise which indicate an increased potential for the Project to adversely affect federally or state listed species, USFWS and DOFAW would be further consulted in compliance with the ESA and HRS Chapter 195D, respectively.

3.7.3.1 General

- Onsite gravel, rock, and soil (or materials purchased from a local supplier) would be utilized when practicable. Offsite sources of materials (such as seed mixes, gravel, and mulches) would be certified as weed-free or inspected before transport to the Project Area.
- The movement of plant or soil material between worksites and islands would be minimized to the extent practicable.
- Construction equipment and vehicles would be washed and/or visually inspected (as appropriate) for excessive debris, plant materials, and invasive or harmful non-native species before transportation to the Project Area; import of materials that are known or likely to contain seeds or propagules of invasive species would be prohibited.
- Suspected invasive pests would be reported through the statewide pest hotline at www.643pest.org or 808-643-PEST (808-643-7378).
- An environmental education and observation program for all construction and operational personnel would be established to train staff to identify listed wildlife, MBTA-protected birds, or rare plants that may be found on-site (e.g., listed waterbirds, Hawaiian goose, Hawaiian hawk, pueo, loulu) and to take appropriate steps if listed wildlife species are found.

3.7.3.2 Plants

- Disturbance to the endangered *P. napaliensis* individuals planted on the KCC campus (Kauaʻi CLS) would be avoided. Prior to construction, an appropriate buffer (e.g., highly visible, temporary fencing and signage) would be established to prevent disturbance in the area.
- If landscaping is installed as part of the Project, native species would be incorporated to the maximum extent practicable, and only non-invasive plants and/or species already found at the sites would be used.

3.7.3.3 Listed Waterbirds

- No additional areas with standing water would be created to prevent waterbird attraction.
- Reduced speed limits would be posted and implemented, and project personnel and contractors would be trained on the presence of endangered birds on-site (particularly for the Kauaʻi and Molokai cable landfalls).

- Prior to project initiation, a qualified biologist would conduct listed waterbird nest surveys where appropriate habitat occurs within the vicinity of the Kauaʻi and Molokai cable landfalls. Nest surveys would be conducted within 3 days before any work is conducted and after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest). If a nest or active brood is found:
    - USFWS and DOFAW would be contacted within 48 hours.
    - A 100-foot buffer would be established and maintained around all active nests and/or broods until the chicks/ducklings have fledged. No potentially disruptive activities or habitat alteration would be conducted within this buffer.
    - A biological monitor that is familiar with the species' biology would be present on the project site during all construction or earth moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.
- If listed waterbirds are found in the Project Area during active construction, all activities within 100 feet of the bird(s) would cease, and the bird(s) would not be approached bird(s). Work would continue after the bird leaves the area of its own accord.

3.7.3.4 Hawaiian Goose/ Nēnē

- Project personnel would be trained to not approach, feed, or disturb nēnē.
- If a nēnē is found in the Project Area during active construction, all activities within 100 feet of the bird(s) would cease, and the bird(s) would not be feed, approached, or disturbed. Work would continue after the bird leaves the area of its own accord.
- If nēnē are observed loafing or foraging within the Project Area during the breeding season (September through April), a biologist familiar with nesting behavior would survey for nests in the area prior to the resumption of work. If a nest is discovered, contact USFWS and DOFAW would be contacted and all work within 150 feet would cease. If a nest is not discovered, work would continue after the bird leaves the area of its own accord.

3.7.3.5 Listed Seabirds

- The use of nighttime lighting during the seabird peak fallout period (September 15 - December 15) would be avoided.
- If a grounded listed seabird is found at the Project, USFWS and DOFAW will be notified immediately.
- If operational on-site lighting is required, it would consist of fixtures that would be shielded and/or directed downward to prevent upward radiation, triggered by a motion detector, and fitted with non-white light bulbs to the extent possible.
- Consistent with the requirements of Pac-SLOPES, competent trained observers would survey marine areas for ESA-listed species prior to the start of work.

3.7.3.6 Hawaiian Hawk/ ʻIo

- If a Hawaiian hawk is detected during active construction, all activities within 100 feet of the bird(s) would cease, and the bird(s) would not be approached. Work would continue after the bird(s) leaves the area of its own accord.

3.7.3.7 Hawaiian Hoary Bat/ ʻŌpeʻapeʻa

- No barbed wire would be used for fencing.
- Woody vegetation taller than 15 feet would not be trimmed, disturbed, or removed between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

3.8 Archaeological and Historic Resources

3.8.1 Affected Environment

An archaeological literature review and field inspection (LRFI) was conducted to assist with identification and documentation of historic properties within the Project Area. This included archival research (with sources including historical documents and maps, aerial photographs, records associated with Land Commission Awards [LCAs], and previous archaeological reports) to construct a history of land use and to determine if historic properties have been previously recorded in or near the Project Area. The field component included a 100 percent pedestrian inspection of each cable landing site to identify any potential historic properties within the Project Area. The results of the background research and field investigation were documented in an LRFI Report. The findings of the LRFI are detailed in Appendix H; a high-level summary of each site is provided below.

3.8.1.1 Kauaʻi Cable Landing Site

3.8.1.1.1 Archival Research

The Project Area for the Kauaʻi cable landing site spans two ahupuaʻa (traditional land division), Hanamāʻulu and Niumalu, within the moku (district) of Puna. Background research indicates these areas were permanently inhabited and used intensively during the pre-Contact period, with permanent habitation and agricultural sites, heiau, and numerous trails crossing the landscape. Intensive agriculture was practiced across Hanamāʻulu, including loʻi kalo (irrigated pondfields with taro). Beginning in the 1850s, sugarcane agriculture became a major commercial enterprise within both Hanamāʻulu and Niumalu Ahupuaʻa. The development of sugar plantations such as the Lihue Plantation and Grove Farm, as well as the settlement of westerners in the region marked the beginning of lasting changes to the area's traditional community and landscape; this included large-scale irrigation infrastructure which diverted water into sugarcane fields, plantation railway systems, and plantation housing for a multi-ethnic labor force. Modern development in the vicinity of the Project Area on Kauaʻi included the construction of the KCC campus and the Outrigger Kauaʻi Beach Resort & Spa.

3.8.1.1.2 Previous Archaeological Studies

A total of 21 archaeological studies have been previously conducted within 0.5 mile of the Project Area on Kauaʻi, resulting in the identification of 11 historic properties. The historic properties identified in the vicinity of the Project Area at Nukoliʻi Beach Park reflect both pre- and post-Contact activities. Pre-Contact historic properties include a portion of a burial complex located north of the Project Area, as well as a habitation complex with two cultural deposit features within the southeastern portion of the Project Area near the beach (including a reinterment area for inadvertently discovered iwi kūpuna that have been identified along the shoreline at Nukoliʻi Beach Park). Post-Contact historic properties include a drainage canal, concrete bridge, and irrigation ditch associated with the sugar plantation industry. Previously identified historic properties proximate to the Project Area at KCC are primarily associated with plantation-era infrastructure and post-Contact activities reflecting a variety of functions, including agriculture, habitation, burial, transportation, and refuse disposal.

Two previously identified sites are located within the Project Area: SIHP 50-30-08-01838 (Walker et al. 1991; Corbin et al. 2002), a pre-Contact habitation complex with two subsurface cultural deposit features as well as a reinterment area for inadvertently discovered iwi kūpuna identified within Nukoliʻi Beach Park (on file, SHPD) and SIHP 50-30-08-02235 (Soltz et al. 2014), a water-control irrigation ditch (SIHP 50-30-08-02235), which runs along the mauka side of Kauaʻi Beach Road crossing the northern edge of the Project Area at Nukoliʻi Beach Park (Figure 14). Corbin et al. (2002) assessed SIHP -01838 as significant under Criteria a and d and recommended preservation "as is." SIHP -02235 was assessed as significant under Criterion d and recommended for no further work by Soltz et al. (2014). No historic properties have previously been identified within the Project Area at KCC.

3.8.1.1.3 LRFI Field Inspection

The LRFI field inspection confirmed the presence of SIHP -02235 and identified two new potential historic properties within the Project Area at Nukoliʻi Beach Park. The two newly identified historic properties include a concrete jetty off the shoreline (T-001) and a water control feature consisting of a metal drainage gate and small drainage ditch (T-002). SIHP -01838 was not observed.

3.8.1.2 Oʻahu Cable Landing Site

3.8.1.2.1 Archival Research

The Project Area for the Oʻahu cable landing site is located in a coastal portion of Honouliuli Ahupuaʻa within the moku of ʻEwa, at Barbers Point Beach Park. The area around Barbers Point Beach Park, traditionally known as Kalaeloa, lies within the uplifted coral reef of the ʻEwa Plain, characterized by abundant limestone pit features. These limestone pits are known to have been used for agricultural activities, and have also been found to house paleontological remains, cultural midden deposits, as well as burials in some instances. This area was also known for its rich marine life and significant trails during the pre-Contact period. The post-Contact name Barbers Point traces its origin to Captain Henry Barber's ship, the Arthur, which ran aground at Kalaeloa in 1796. After ships continued to run aground in this area, a lighthouse was built in the 1880s. With foreign arrivals also came foreign diseases which drastically reduced the Native Hawaiian population. Honouliuli became popular for cattle and sheep ranching with the opening of Honouliuli Ranch, as well as the cultivation of sugarcane with the

establishment of the Ewa Plantation Company. There was subsequently a major shift in land use in Honouliuli from agricultural to military in the late nineteenth to early twentieth century. Modern development included the establishment of Campbell Industrial Park around the area of Barbers Point Beach Park.

3.8.1.2.2 Previous Archaeological Studies

A total of 16 archaeological studies have been previously conducted within 0.5 mile of the Project Area at Barbers Point Beach Park, resulting in the identification of 10 historic properties. Although no historic properties were previously identified within the Project Area, nearby sites reflect a mix of pre- and post-Contact activities in the Kalaeloa (Barbers Point) area. Nearby historic properties associated with pre-Contact activities include a cultural deposit and complexes of modified and unmodified limestone pits, which are ubiquitous across the ʻEwa Plain. The post-Contact historic properties previously identified in the vicinity include features associated with the commercial sugarcane industry, maritime history, and coastal navigation and defense; these include irrigation ditches, military complexes related to the Barbers Point Military Reservation, the Barbers Point Lighthouse, and two documented shipwrecks, the Arthur (1796) and Liliu (1877).

3.8.1.2.3 LRFI Field Inspection

No potential historic properties were identified within the Project Area at Barbers Point Beach Park during the field inspection.

3.8.1.3 Maui Cable Landing Site

3.8.1.3.1 Archival Research

The Project Area for the Maui cable landing site is located within the traditional moku of Wailuku, and the ahupuaʻa of the same name. Before the introduction of commercial sugarcane agriculture radically transformed the landscape, sweet potato plantations and fishing settlements lined the north coast of Maui, while irrigated kalo agriculture was practiced on the plains around the Wailuku River. Pleistocene aeolian sand dunes comprised much of the isthmus between East and West Maui, including areas within and surrounding the Project Area. Marine resources were abundant around Kahului Bay, and a wide variety of fishing techniques were practiced. Commercial sugarcane agriculture began in Wailuku on a small scale in the early 1800s, with a small number of mills and plantations. Much of the infrastructural development in Wailuku through the nineteenth and early twentieth centuries was inextricably tied to the growth of commercial sugarcane agriculture. This included large-scale irrigation infrastructure which diverted water into sugarcane fields, the Kahului Railroad, Kahului Harbor, and much of the early development of Kahului Town. The town of Kahului continued to expand and develop in the late 1940s through the 1950s, with the construction of a shopping center and the opening of the first hotels in Kahului. Within the Project Area, the western breakwater of Kahului Harbor was constructed in 1901 and was subsequently expanded throughout the twentieth century. Maui Vocational School was built in 1931 and expanded over time into what is now UH Maui College.

3.8.1.3.2 Previous Archaeological Studies

A total of 34 archaeological studies have been previously conducted within 0.5-mile of the Project Area for the Maui cable landing site, resulting in the identification of 34 historic properties which reflect both pre- and post-Contact activities in Kahului. The Project Area on Maui is largely situated on Puuone sands, and a number of burials in the vicinity reflect the traditional use of coastal sand dunes as a burial area. Other pre-Contact historic properties in the area include subsurface cultural deposits and habitation complexes. All burials and historic properties associated with the pre-Contact period are located to the north and west of the Project Area.

Post-Contact historic properties include features associated with commercial sugarcane agriculture and related infrastructure, the development of Kahului Town, and the impacts of World War II (WWII). This includes portions of the Kahului Railroad Berm, commercial and residential structures, recreational and educational facilities, and WWII infrastructure. SIHP 50-50-04-04232, a series of WWII-era Quonset huts associated with the 18th Service Battalion Camp, was identified just west of the Kahului Harbor breakwater. Following the war, the Quonset huts were repurposed into commercial office and storage space until they were dismantled in the 1980s. The remaining concrete pads were destroyed, reburied, or incorporated into the design of Maui Central Park (Heidel et al. 1997).

A portion of the Project Area lies within the Kahului Harbor Historic District (SIHP 50-50-04-02953; Figure 14), which was added to the State Register of Historic Places in 1974 during the statewide inventory. According to the nomination, “Kahului Harbor consists of the piers, wharves, breakwaters, and associated structures that make up the active harbor facility. It is significant for its role in the development of the town of Kahului from 1901 to 1931.”

3.8.1.3.3 LRFI Field Inspection

No potential historic properties were identified within the Project Area for the Maui cable landing site as part of the LRFI field inspection.

3.8.1.4 Molokai Cable Landing Site

3.8.1.4.1 Archival Research

The Project Area for the Molokai cable landing site is located within the traditional moku of Kona, in the ahupuaʻa of Kaunakakai. A variety of marine resources, including good fishing areas and gathering places for resources such as aloalo (squilla, or mantis shrimp) in Kaunakakai and the southern coast of Molokai were likely one factor that contributed to this region being densely settled throughout the pre-Contact period. The relatively calm fringing reefs also provided ideal conditions for the development of aquaculture, with at least 58 loko iʻa (fishponds) being constructed along the leeward coast of the island. In addition, several heiau were located in the vicinity. In 1855, the entire ahupuaʻa was purchased by Kamehameha V, who built a large secluded estate, Mālama, along the shoreline. Following the death of Bernice Pauahi Bishop, Kaunakakai Ahupuaʻa was passed to the trustees of her estate, and in 1897, Molokai Ranch purchased the ahupuaʻa from the trustees. The ranch subsequently incorporated the American Sugar Company and developed the Kaunakakai Harbor and wharf area, installing a narrow-gauge railroad to facilitate the export of sugar and later, pineapple and

cattle. Following the end of large-scale agriculture, Kaunakakai continued to develop as Molokai's major residential, commercial, and civic center.

3.8.1.4.2 Previous Archaeological Studies

A total of 33 archaeological studies have been previously conducted within 0.5-mile of the Project Area for the Molokai cable landing site, resulting in the identification of 19 historic properties. The previously identified historic properties reflect the continuous use of the south coastal flats of Kaunakakai during pre-Contact times for habitation, ceremonial practices, salt production, and agriculture. These include heiau, cultural deposits containing artifacts, midden, and charcoal, which yielded a calibrated radiocarbon date of AD 1230–1340 (Athens and Silva 1983), as well as a habitation complex and a possible burial. Post-Contact historic properties are largely associated with agricultural, industrial, and infrastructural activities and include walls and enclosures for animal husbandry, refuse pits, levees, the Molokai Public Library, and remnants of the wharf and railroad related to the American Sugar Company.

Two previously identified historic properties are within the Project Area at Molokai Yacht Club: SIHP 50-60-03-00630 (Athens and Silva 1983; Komori 1983) is a pre-Contact cultural deposit and 50-60-03-02573 (Lee-Greig et al. 2016) is a post-Contact cultural deposit consisting of a burn area with associated remnant building material, including glass, ceramic, and metal. While no significance assessment was made for SIHP -00630 by Komori (1983) or Athens and Silva (1983), archaeological monitoring was recommended for all subsurface construction-related activities (Athens and Silva 1983). Lee-Greig et al. (2016) assessed SIHP -02573 as significant under criterion d. Given the extensive documentation available for the site, the study concluded that there would be "no historic properties affected." However, due to the potential for encountering sensitive cultural remains within the Project Area, archaeological monitoring was recommended during all ground-disturbing activities (Lee-Greig et al. 2016). No historic properties were previously identified within the Project Area at Molokai Education Center.

3.8.1.4.3 LRFI Field Inspection

The LRFI field inspection identified a single potential historic property within the Project Area at Molokai Yacht Club. T-003 is a large debris pile containing concrete slabs with exposed rebar, scrap metal, and some cut tree trunks and other vegetation, indicating that this may be a very late post-Contact and/or recent deposit (Figure 14). No indications of SIHP -00630 or -02573 were visible from the surface during the field inspection. No historic properties were identified within the Project Area at Molokai Education Center.

3.8.1.5 Lānaʻi Cable Landing Site

3.8.1.5.1 Archival Research

The Project Area for the Lānaʻi cable landing site lies within Mānele, located on the southern coastal end of Pālāwai Ahupuaʻa. This area provided abundant marine resources and a launch for travels to and from Lānaʻi during the pre-Contact period. There were several sites of pre-Contact settlement in Pālāwai and Kamaʻo Ahupuaʻa, including a permanent village in Mānele, and along the gulch were

house sites, terraces, enclosures, and mulch pits which supported agricultural activities. A number of pre-Contact trails ran along the shore and connected the coast to the uplands. As with many of the more recent roads on Lānaʻi, the road leading from Mānele Harbor to the uplands of Pālāwai was adapted from the pre-Contact trail system. The sand dunes extending behind Mānele are known to contain iwi kūpuna. In the Post-Contact period, this area was initially used for sheep and later transitioned into cattle ranching. Impacts to Lānaʻi included significant deforestation, caused by the introduction of ranching and nonnative terrestrial mammals, the ʻiliahi (sandalwood; *Santalum paniculatum*) trade, increased demand for staple crops, and new demands on firewood to process whale blubber. Mānele Bay was recognized by foreign arrivals as a key port location from the 1850s onward, with a breakwater and boathouse built in 1873. In 1922, the Lānaʻi Company's ranch was acquired as part of the Hawaiian Pineapple Company. The cattle herd was reduced to make way for large-scale pineapple cultivation, which continued to expand until the final harvest of pineapples in November 1992.

3.8.1.5.2 Previous Archaeological Studies

A total of 14 archaeological studies have been previously conducted within 0.5-mile of the Project Area for the Lānaʻi cable landing site, resulting in the identification of 29 historic properties which reflect Mānele's intensive pre-Contact use as a village site and burial area. These include a number of complexes that include pre-Contact habitation, agricultural, ceremonial, and burial sites. Post-Contact historic properties are mostly related to ranching activities and associated infrastructure, such as a boundary wall, well, roadway and trail complex, and a cattle chute and holding pen. Much of the surrounding area, including several burial sites, were significantly disturbed by bulldozing and other construction activities associated with the Mānele Small Boat Harbor Project in 1964-1965. None of the previously identified historic properties are within the Project Area for Lānaʻi cable landing site.

3.8.1.5.3 LRFI Field Inspection

The LRFI field inspection identified two potential historic properties within the Project Area for the Lānaʻi cable landing site; these included a concrete ditch segment (T-004) and a retaining wall constructed of basalt stones (T-005) likely related to post-Contact ranching and related activities (Figure 14).

3.8.1.6 Hawaiʻi Island Cable Landing Site

3.8.1.6.1 Archival Research

The Project Area for the Hawaiʻi Island cable landing site is located within the traditional moku of Hilo, in the ahupuaʻa of Waiākea. This area was known for permanent habitation and agricultural sites during the pre-Contact period. References to streams, grottos, and waterholes, as well as shoreline access, fishing, and canoe landings, reflect the abundant water resources. In the early 1800s, Hilo's forests and harbor made it an appealing location for the sandalwood trade. The subsequent growth of the sugar industry through the first half of the 1900s necessitated improved land and sea transport infrastructure, which included harbor facilities at Hilo Bay and the development of the Hilo Railroad, which operated from 1899 to 1946. Following passage of the Hawaiian Homes Commission Act in 1920, Keaukaha-Panaewa became one of the first Hawaiian Homesteads established. In 1966, a

municipal sewage system was developed for Hilo, which included the installation of the Hilo Sewage Treatment Plant at Puhi Bay. This facility operated until the 1990s when it was replaced by a new wastewater treatment facility built near the airport; the Old Hilo Wastewater Treatment Plant was subsequently redeveloped into PACRC in support of UH Hilo's aquaculture and marine science programs.

3.8.1.6.2 Previous Archaeological Studies

A total of 15 archaeological studies have been previously conducted within 0.5-mile of the Project Area for the Hawai'i Island cable landing site, resulting in the identification of 41 historic properties, which are largely associated with post-Contact activities. The historic properties in the vicinity of the Project Area at PACRC are architectural features associated with post-Contact development of Hilo and Keaukaha; these include the Hilo Breakwater, Hilo Harbor, Hilo Railroad Company tracks, Peter Arioli House, Kahauolopua House, St. Mary's Gate of Heaven Church, Kūhiō Memorial Chapel, and Kamehameha Hall. Identified historic properties in the vicinity of the Project Area at UH Hilo include platforms, mounds, modified outcrops, linear walls, pit features, enclosures, and drainage features; the majority of these features are associated with sugarcane cultivation by the Waiakea Mill Company, as well as the Hilo Dairy facilities.

3.8.1.6.3 LRFI Field Inspection

During the field inspection that was carried out as part of the LRFI, three potential historic properties were identified in the Project Area at PACRC. T-006 and T-007 consist of circular and rectangular concrete tanks that were likely constructed in 1965-1966 as part of the infrastructure for the Hilo Wastewater Treatment Plant, and which later became fish rearing tanks when the plant was repurposed into PACRC. T-008 consists of metal rebar and concrete structures that may have been related to infrastructure for the former wastewater facility (Figure 14). A modern low, rectangular stone platform with kī plants at three corners was also observed on the makai side of the Project Area; this is a recently constructed memorial for a local man known as Uncle Piggy, for whom this area has also been nicknamed "Piggy's Point."

Three potential historic property features were identified in the Project Area at UH Hilo. These included a concrete culvert (T-009), as well as the Wentworth Building (T-010) and Business Education & Technology Building (T-011), which were likely part of the original construction of the campus in 1955 (Figure 14).

3.8.2 Potential Impacts and Mitigation Measures

Project construction would involve ground disturbing activities such as grading, grubbing, and excavation for installation of the proposed infrastructure, which could potentially affect historic properties within the Project Area. As detailed in the LRFI and summarized above, a total of five historic properties have previously been identified within the Project Area, and an additional 11 potential historic properties were identified as part of the LRFI pedestrian survey; the previously identified and potential historic properties within the Project Area are summarized in Table 3-11 and are shown in Figure 14.

Table 3-11. Previously Identified and Potential Historic Properties Within Project Area

SIHP #	Type	Possible Function	Probable Age	Source / Notes
Kaua'i Cable Landing Site				
50-30-08-01838	Cultural deposit, reinterment area	Habitation, burial	Pre-Contact	Walker et al 1991; Corbin et al. 2002; On file, SHPD; assessed as significant under Criteria a and d and recommended for preservation
50-30-08-02235	Ditch	Water control	Post-Contact (early 1960s)	Soltz et al. 2014; assessed as significant under Criterion d and recommended for no further work
T-001	Concrete jetty	Transportation	Post-Contact	Potential historic property identified by Pacific Legacy as part of LRFI
T-002	Grate/ditch	Water control	Post-Contact/ Recent	Potential historic property identified by Pacific Legacy as part of LRFI
Maui Cable Landing Site				
50-50-04-02953	Kahului Harbor Historic District	Harbor facility (piers, wharves, breakwaters, and associated structures)	Post-Contact (1901-1931)	Added to the State Register of Historic Places in 1974 during the statewide inventory
Molokai Cable Landing Site				
50-60-03-00630	Cultural deposit	Habitation (buried cultural layer, hearths, post molds, possible wall, pavement, trash pits, refuse deposits)	Pre-Contact	Athens and Silva 1983; Komori 1983; Titchenal 1998; no significance assessments made, data recovery and archaeological monitoring recommended
50-60-03-02573	Cultural deposit	Burn area with associated remnant building material, including glass, ceramic, and metal	Post-Contact	Lee-Greig et al. 2016; assessed as significant under Criterion d and recommended archaeological monitoring
T-003	Debris pile	Refuse	Post-Contact/ Recent	Potential historic property identified by Pacific Legacy as part of LRFI
Lānai Cable Landing Site				
T-004	Concrete ditch	Water control	Post-Contact	Potential historic property identified by Pacific Legacy as part of LRFI
T-005	Stone wall	Soil retention	Post-Contact	Potential historic property identified by Pacific Legacy as part of LRFI
Hawai'i Island Cable Landing Site				
T-006	Circular/rectangular concrete tanks	Repurposed wastewater infrastructure	Post-Contact	Potential historic property identified by Pacific Legacy as part of LRFI
T-007	Circular/rectangular concrete tanks	Repurposed wastewater infrastructure	Post-Contact	Potential historic property identified by Pacific Legacy as part of LRFI
T-008	Metal and concrete pipe infrastructure	Wastewater treatment infrastructure	Post-Contact	Potential historic property identified by Pacific Legacy as part of LRFI
T-009	Concrete culvert	Water control	Post-Contact	Potential historic property identified by Pacific Legacy as part of LRFI
T-010	Wentworth Building	Education	1955	Potential historic property identified by Pacific Legacy as part of LRFI
T-011	Business Education and Technology Building	Education	1955	Potential historic property identified by Pacific Legacy as part of LRFI

State historic preservation law (HRS Chapter 6E) requires consultation with the State Historic Preservation Division (SHPD) to review the effect of a proposed project on historic properties and specifies that SHPD concurrence is needed before a project may commence. HRS Chapter 6E consultation was initiated with SHPD for the HIFL Project on June 23, 2025.

The Project also requires authorization from the USACE pursuant to Section 10 of the Rivers and Harbors Act for installation of the subsea cable (see Section 5.1); as this approval constitutes a federal action, the Project must also comply with the National Historic Preservation Act (NHPA). Section 106 of the NHPA requires that the federal agency consider the effect of the undertaking on historic properties within the area of potential effect (APE), including consultation with the State Historic Preservation Officer (SHPO) and Native Hawaiian Organizations (NHOs) that might attach religious and cultural significance to historic properties in the APE. An initial Section 106 consultation letter was sent to more than 230 NHOs and other entities and individuals on September 22, 2025; a consultation letter was subsequently sent to the SHPO on September 24, 2025. These letters included a summary of the LRFI, as summarized in Section 3.8.1, and sought input on historic properties within the APE and the nature of any potential effects of the Project.

As detailed in the LRFI and described in the HRS Chapter 6E and NHPA Section 106 consultation letters, an archaeological inventory survey (AIS) with subsurface testing was recommended to fully identify and document all potential historic properties and provide significance assessments and recommendations in accordance with federal and state requirements. Furthermore, the LRFI recommends an architectural survey of any historic buildings or structures that may be impacted by the Project. In a letter dated October 23, 2025, the SHPO responded with a request for an AIS to fully identify and inventory all historic properties within the Project Area, and to provide significance assessments and mitigation recommendations for identified historic properties. Consultation specific to the AIS was requested to confirm the appropriate form of AIS documentation. To this end, an AIS subsurface testing strategy was developed and provided to the Office of Hawaiian Affairs (OHA), cultural descendants, and other appropriate consulting parties for review, and subsequently submitted to SHPD/SHPO for review on November 25, 2025.

HRS Chapter 6E and NHPA Section 106 consultation is ongoing and will be completed as part of the permitting and entitlement process, prior to commencement of the Project. Based on the effect determination, any mitigation requirements would be determined in consultation with SHPD/SHPO and other consulting parties; all mitigation measures identified through this process would be implemented as part of the Project. In the unlikely event that any subsurface historic resources, such as human skeletal remains, structural remains, cultural deposits, or artifacts are identified during construction, all work would cease in the immediate vicinity of the find, the find would be protected from additional disturbance, and SHPD would be notified. If human skeletal remains are discovered, all work in the immediate vicinity would cease, the area would be secured, and the Project archaeologist would notify the SHPD Archaeology Branch and History and Culture Branch, as well as the appropriate Island Burial Council. Burial finds would be treated in accordance with HRS Chapter 6E-43 and HAR Section 13-300, as well as the Native American Graves Protection and Repatriation Act (NAGPRA) for portions of the Project Area situated on DHHL land. No further work in the area or investigation of the find would occur without a written directive from SHPD.

Based on the historic properties known to occur and with completion of HRS Chapter 6E and NHPA Section 106 consultation, including implementation of any mitigation measures identified through those processes, the Project is not expected to result in adverse effects to archaeological and historic properties.

3.9 Cultural Resources and Traditional and Customary Practices

A cultural impact assessment (CIA) and Ka Paʻakai Analysis was conducted to assess potential impacts of the Project on cultural resources as well as traditional and customary practices. Pursuant to the requirements of HRS Chapter 343, the purpose of a CIA is to evaluate potential impacts of a proposed action on traditional cultural practices; guidelines for assessing cultural impacts were adopted by the State of Hawaiʻi Environmental Council on November 19, 1997. Consistent with this guidance, the CIA addresses the cultural resources, practices, and beliefs within the relevant ahupuaʻa for each cable landing site.

This effort also incorporated a Ka Paʻakai Analysis, which is intended to assist the state in fulfilling its constitutional obligation to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupuaʻa tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the state to regulate such rights" (Article XII, Section 7 of the Constitution of the State of Hawaiʻi). The Ka Paʻakai Analysis is based on an analysis framework established by the Hawaiʻi Supreme Court in Ka Paʻakai v. Land Use Commission (94 Hawaiʻi 31, 74, 7 P.3d 1068, 1084 [2000]), which seeks to balance "the competing interests of protecting Native Hawaiian culture and rights, on the one hand, and economic development and security on the other." Specifically, the framework identified by the Court specifies the following analysis be conducted:

- The identity and scope of valued cultural, historical, or natural resources in the [petition] area, including the extent to which traditional and customary native Hawaiian rights are exercised in the [petition] area;
- The extent to which those resources—including traditional and customary native Hawaiian rights—will be affected or impaired by the proposed action; and
- The feasible action, if any, to be taken by the relevant agency to reasonably protect native Hawaiian rights if they are found to exist.

The assessment conducted to support the CIA and Ka Paʻakai Analysis included archival research regarding significant place names, moʻolelo (story, tradition, record), kaʻao (legends), ʻōlelo noʻeau (proverbs), mele (songs), traditional subsistence and gathering methods, ritual and ceremonial practices; and background research focused on land transformation, development, and population changes beginning with the early post-Contact era to the present day. Archival documents, primary and secondary cultural and historical sources, historic maps, and photographs were reviewed for information pertaining to the Project Area. In addition, consultation was conducted with a range of government agencies, advisory councils, local community organizations, and individuals with generational ties to each ahupuaʻa to obtain input regarding present and past uses, cultural sites, traditional gathering practices, cultural association and any associated cultural concerns. This effort

included outreach to more than 325 organizations, agencies, and community members. A total of 33 individuals provided feedback or referrals via email, or were interviewed either via phone or via Zoom; in addition, approximately 20 individuals attended a meeting and shared feedback in person. The results of this process are detailed in the CIA and Ka Paʻakai Analysis Report (Appendix I); the findings are summarized below.

3.9.1 Affected Environment

3.9.1.1 Kauaʻi Cable Landing Site

3.9.1.1.1 Background Research

Based on oral historical accounts and moʻolelo, Hanamāʻulu has long been known as a good location for canoe landings, which were made easier in the protected bays. Moʻolelo and the presence of a major heiau also suggest that Hanamāʻulu was the residence of some aliʻi. There is also a known burial area (State Inventory of Historic Places [SIHP 50-30-08-00103) located in close proximity to the northern end of the Nukoliʻi Beach Park portion of the Project Area as well as a habitation complex consisting of two cultural deposit features (SIHP 50-30-08-01838) within the southeastern portion of the Project Area, closest to the beach (including a reinterment area for inadvertently discovered iwi kūpuna along the shoreline at Nukoliʻi Beach Park), indicating that people were utilizing this area for habitation and burial purposes beginning in the pre-Contact period. Many oral historical accounts of Niumalu discuss the botanical landscape, including niu, or coconut trees, which are associated with the place name, as well as mokihana, a species endemic to Kauaʻi. Mele also recount the beauty of the area, in addition to the florals. Alakoko Fishpond is one of the most storied locations in Niumalu Ahupuaʻa, and its construction is often attributed to menehune, commissioned by aliʻi. Handy (1940) observed that despite the small size of Niumalu Ahupuaʻa, it was one of the most important areas for fishing in Kauaʻi.

Archival sources highlight the population center that developed over time on the southeastern shore of Kauaʻi, which is now known as the city of Līhuʻe. The entirety of Hanamāʻulu and Niumalu Ahupuaʻa were awarded to Ke Aliʻi Victoria Kamāmalu as part of a konohiki award (LCA 7713, ʻĀpana 2). Niumalu Ahupuaʻa was passed from Kamāmalu, to her father, Kekuanaoa, then to her brother Kamehameha V. Upon his death, it was inherited by her half-sister Ruth Keelikolani, who later sold the land to Paul P. Konoa in 1883 (Ching et al. 1973). Although no LCAs were identified in the vicinity of the Project Area at either Nukoliʻi Beach Park or KCC, there are around 20 kuleana parcels claimed within Hanamāʻulu Ahupuaʻa (Soltz et al. 2014) and 24 within Niumalu Ahupuaʻa (Kamai et al. 2016). Most of the awards in both ahupuaʻa include loʻi, kula lands, and house lots (Kamai et al. 2016), indicating that Hanamāʻulu and Niumalu were utilized for a variety of subsistence strategies, including fishing as well as irrigated and dryland agriculture (Handy 1940).

Large-scale sugarcane cultivation was the notable post-Contact agricultural endeavor, largely carried out by foreign industrialists. The portion of the Project Area at KCC is situated adjacent to Puhi Camp, which was associated with Grove Farm. Post-Contact development around the Nukoliʻi Beach Park portion of the Project Area included the Nukolii Dairy, as well as a racetrack and airfield.

Previous ethnographic research in the Hanamāʻulu Bay area highlights the importance of gathering hāʻukeʻuke (edible sea urchin), limu, limu kohu, limu wawaeʻiole, pili grasses, wild spinach, and ʻopihi; spearfishing, reef fishing, throw net fishing, and other types of fishing; catching lobster, heʻe, and ʻoʻopu; crabbing; diving; and kilo (spotting) for akule in the bay. Also stressed was the importance of Hanamāʻulu Bay and the surrounding beach areas as a burial area (Rosendahl 2001).

3.9.1.1.2 Community Consultation

As part of the consultation for the current CIA and Ka Paʻakai Analysis, one response was received from Jan TenBruggencate on behalf of Kaiola Canoe Club. It was explained Kaiola Canoe Club operates out of Niumalu and Nawiliwili, but uses the waters offshore of Nukoliʻi. It was also noted that Nukoliʻi Beach is extensively used by recreational beachgoers, anglers, shell collectors, marine debris cleanup operations, scuba and skin divers, and others. Marine wildlife such as Hawaiian monk seals and Hawaiian green sea turtles may also use the shoreline in this area. In addition, reference was made to extensive pre-Contact activities in the region, as well as post-Contact resources including a WWII-era marine camp, former horse racing track, significant dairy operation, cattle ranching, and more than a century of sugarcane-growing activities. The response provided support for the Project but expressed concerns about potential access restrictions to the ocean, particularly for emergency marine rescue operations or any long-term restrictions on shoreline use.

3.9.1.2 Oʻahu Cable Landing Site

3.9.1.2.1 Background Research

Barbers Point Beach Park lies within the uplifted coral reef of the ʻEwa Plain in the area traditionally known as Kalaeloa. The limestone pits that characterize this area have been found to contain significant cultural deposits, paleoenvironmental data, as well as burials in some instances. The ʻōlelo noʻeau which reference Honouliuli or ʻEwa often describe the area's characteristic red earth and abundant marine resources, though these are generally referencing the West Loch/Puʻuloa area further to the east.

During the Mahele, Honouliuli Ahupuaʻa was awarded to Miriam Keʻahikuni Kekauʻōnohi. Archival research did not identify LCAs in the vicinity of the Project Area, and the majority of LCAs in the ahupuaʻa are concentrated near Honouliuli Stream in the Puʻuloa/West Loch area. Post-Contact land use was largely focused on commercial ranching and agricultural ventures, including Honouliuli Ranch and the Ewa Plantation Company. The ʻEwa Plain and Puʻuloa also became key sites for military development during WWII. A residential and industrial boom following the war led to the development of Makakilo, Kapolei, and Campbell Industrial Park. Significant features proximate to the Project Area include Puhilele, the Barbers Point Lighthouse.

Previous consultation efforts for projects in Honouliuli have identified a range of cultural resources, practices, and beliefs. This included rich marine fisheries, salt pans, coastal freshwater sources, and limu. The Honouliuli coastline was once home to up to 80 varieties of limu. The karst system beneath Honouliuli provided natural drainage of the area and carried freshwater into the ocean through springs along the shoreline, which in turn contributed to the health of the limu (Tanaka et al. 2024). Notable marine resources include numerous species of fishes, crabs, turtles, dolphins, stingrays, and

sharks. Other important features identified included the network of pre-Contact trails crosscutting the ahupuaʻa, many of which either intersect with or have been developed into modern roads; natural coral and rock coves used for shelter; limestone pit features, and in particular their potential to contain iwi kūpuna; and the spiritual strength of burial areas in Honouliuli. The Honouliuli landscape was also a place for transcending between the physical and ethereal plains and contained the leina a ka uhane, or a place of leaping spirits.

3.9.1.2.2 Community Consultation

A small number of individuals acknowledged receipt of the consultation letter and expressed overall support for the project. Detailed feedback was received from three individuals - Mana Kaleilani Cáceres and Glen Kila provided feedback via email, and Ulukoa Duhaylonsod participated in an interview. These individuals emphasized that Honouliuli is a living cultural landscape, with descendants and practitioners continuing to perpetuate, revive, and build on long-standing traditional cultural practices. They specifically spoke to the following cultural resources, practices, and beliefs relative to the Project Area for the Oʻahu cable landing site: the potential for iwi kūpuna to be present; the potential presence of access trails or resource gathering sites; valued offshore resources including those identified through archival research (the Arthur and the Liliu) and marine resources including fisheries, limu, and coral; the unique geomorphology of the Barbers Point area, and in particular the possible presence of limestone pit features or kālua, which carry great cultural significance beyond that which they might contain and should be considered cultural resources in their own right; kāluamahi (traditional agricultural practices in limestone pits) and kāluawai (traditional water access points in limestone pits); the potential for limestone pit features, many of which have not been investigated, to contain cultural deposits, environmental data, and/or iwi kūpuna; the presence of fresh and brackish water sources underneath the limestone cap rock in Kalaeloa; the nearby wildlife refuge and native species that rely on the subterranean water accessed through kāluawai including ʻōpaeʻula, ʻakoko and the ʻEwa hinahina; and other resources and places which are located further away from the Project Area but still hold significant value, including Ordy Pond and the permanent settlements and expansive irrigated kalo floodplains near Puʻuloa.

3.9.1.3 Maui Cable Landing Site

3.9.1.3.1 Background Research

Wailuku Ahupuaʻa is a large and centrally located region in the isthmus between East and West Maui. It is a part of Na Wai Ehā, or the “Four Waters of Maui,” along with Waikapu, Waiehu, and Waiheʻe, all of which were later grouped into a single district known as Na Poko. The meaning of the name Wailuku, often translated to “water [of] destruction,” has been attributed to a late 18th century battle between Kalaniopuʻu and Kahekili known as “Ahulau ka Piʻipiʻi i Kakanilua,” or “Slaughter of the Piʻipiʻi at Kakanilua.” An alternate explanation attributes the name to the 1790 Battle of ʻĪao, also known as the “Battle of Kepaniwai,” or “the damming of the waters.” During the pre-Contact era, marine resources were abundant around Kahului Bay, and a wide variety of fishing techniques were practiced, including bag net fishing. Sweet potato plantations and fishing settlements lined the north coast of Maui, with loʻi kalo concentrated around the plains of the Wailuku River. The sandy dunes of

the isthmus are a known burial area, and the Plains of Kamaʻomaʻo is an area where spirits were known to wander.

During the Mahele, Wailuku Ahupuaʻa was designated as Crown Lands. A number of LCAs were awarded in Wailuku, though most are located in the flood plains of ʻĪao Valley, far from the Project Area for the Maui cable landing site. A smaller number are clustered closer to the shore, just north of the Project Area. Many of these were awarded as land deeds by Kamehameha IV. A portion of the Project Area for the Maui cable landing site lies within LCA 420, awarded to H. Kuihelani.

Vivid descriptions of the abundant landscapes of Na Wai Ehā with its "fat fish" and "lovely gardens" prior to the introduction of commercial sugarcane agriculture emphasize the radical transformations Wailuku's landscapes underwent during the post-Contact period. A portion of the Project Area is located within former Hawaiian Commercial & Sugar Company (HC&S) sugarcane plantation lands. The development of large-scale irrigation infrastructure, the Kahului Railroad, Kahului Harbor, and much of the early development of Kahului Town was largely a product of the sugarcane industry on Maui during the late nineteenth and twentieth centuries.

Previous consultation efforts for projects in Wailuku Ahupuaʻa emphasized the traditional and enduring subsistence, habitation, and recreational activities in and around Kahului Harbor. Traditional practices included fishing in Kanahā Pond, shellfish gathering, picking of limu, turtle hunting, hukilau (fishing with a seine) along the Kahului shore, gathering salt from salt pans, and taro cultivation (Welch et al. 2004). The area around the harbor continues to be used for these types of activities, including pole or throw net fishing, as well as canoe paddling, surfing, and swimming. Given the settlement history of this area, as well as the prevalence of sandy soil and sand dunes, potential burials and cultural deposits could also be present.

3.9.1.3.2 Community Consultation

Consultation for the current CIA and Ka Paʻakai Analysis included input by Roselle Keliʻihonipua Bailey (Kaʻimi Naʻauao O Hawaiʻi Nei Institute). Ms. Bailey highlighted some of the traditional cultural practices that were once practiced in this area but have since been limited by the extensive development in and around the Project Area. This included fishing and gathering limu, and maintaining the ʻauwai system to ensure the water that flowed through them was filtered and directed to the appropriate areas to nourish the landscape. Ms. Bailey observed that people do not eat food from the river anymore, because it has become polluted. The neighborhoods have also changed, shifting away from families living communally to large, gated, private properties. She noted that the shift in food base from resources that came from the land to one based largely on imported goods has also impacted traditional practices and care for the landscape.

3.9.1.4 Molokai Cable Landing Site

3.9.1.4.1 Background Research

Kaunakakai was formerly known as Kaunakahakai, which references the use of the harbor as a place for canoe landings and fishing. Due to freshwater springs located offshore, which prevented coral growth and thus created a natural break in the reefs, it was renowned as a canoe landing site and

features prominently in recorded oral traditions and tales of aliʻi landing at Kaunakakai during campaigns for control of the Oʻahu, Maui, and Hawaiʻi Island chiefdoms throughout the pre-Contact and early post-Contact period. The moʻolelo of ʻAiʻai references a unique fishing method practiced at Kaunakakai, consisting of kicking pua onto the shore. The rich marine resources of Kaunakakai including the aloalo (squilla, or mantis shrimp) were also noted. The fresh wai (water) descending from the mountains via carved gulches also sustained wetland and dryland agriculture, including kalo and ʻuala. Moʻolelo also reference the extensive fields of pili grass in Kaunakakai.

Kaunakakai Ahupuaʻa was not awarded during the initial 1848 Mahele division of the lands. Land records indicate that Kaunakakai was owned by Kalani Pueo in 1843 and subsequently passed to Abner Pākī. In 1855, Kamehameha V purchased the entire ahupuaʻa and built a large, secluded estate, Mālama, near Kaunakakai Harbor and fronting the beach; this property is now Mālama Cultural Park, which serves as an important community gathering space, supporting a wide range of recreational, cultural, and educational activities. Kaunakakai Ahupuaʻa eventually passed to Bernice Pauahi Bishop and thence to the trustees of her estate. In 1897, Molokai Ranch purchased the ahupuaʻa and in 1898 incorporated the American Sugar Company, ushering in an era of cattle ranching and large-scale sugarcane and pineapple agriculture. The growth of Kaunakakai Town and Kaunakakai Harbor was largely a product of these industries.

Previous consultation efforts for projects near the Project Area in Kaunakakai Ahupuaʻa stressed the importance of Kaunakakai as a favored canoe landing place, thanks at least in part to the large natural channel through the fringing reef which provides access to a central location on Molokai, as well as the availability offshore freshwater springs. The wharf area was described as being home to a wide range of native and non-native nearshore species of fish, invertebrates, and limu. Noted cultural practices in the area included traditional fishing practices and collecting limu, both of which were cited as the means by which some participants maintained their livelihoods and subsistence. The area around Kaunakakai Wharf was also described as a site for fishing contests and games associated with the Makahiki. Other uses of the wharf area include swimming, exercise, sport fishing, a gathering place for community and social events, and an important space to connect with the ocean and the environment. Due to its central location, Kaunakakai has long served as a meeting place, for holding councils, for ruling aliʻi and, more recently, for community members and cultural practitioners.

3.9.1.4.2 Community Consultation

Five people responded to the CIA consultation letter and provided feedback or referrals via email. Sheron Maile Sasada identified activities being carried out in the vicinity of the Project Area at Molokai Yacht Club and provided referrals and Teave Heen provided a letter as an email attachment.

Native Hawaiian families have carried out traditional cultural practices and beliefs for generations in Kaunakakai. Archival research and communications with knowledgeable individuals who have generational ties to the area have identified a range of these practices, many of which center on the area surrounding Kaunakakai Harbor and continued access to its shores and marine resources. This includes cultural practices such as fishing, traditional gathering practices, surfing, diving, and swimming, as well as paddling and canoe races. The responsibility to mālama the marine ecosystems

and resources of Kaunakakai and to respect the deep ties of Hawaiians to the ocean and Kanaloa were emphasized during consultation.

3.9.1.5 Lānaʻi Cable Landing Site

3.9.1.5.1 Background Research

Mānele was the location of a permanent pre-Contact village as well as a burial area. The gulch Kaupakuea is named for the thatched ridge poles of the many house sites of the community who once populated Mānele, and the gulch was lined with house sites, terraces, enclosures, and mulch pits where a wide variety of crops were cultivated, including kalo, ʻuala, niu, milo, noni, kou, hala, and wiliwili. A number of pre-Contact trails ran along the shore and connected the coast to the uplands. As with many of the more recent roads on Lānaʻi, the road leading from Mānele Harbor to the uplands of Pālāwai was adapted from the pre-Contact trail system. The sand dunes extending behind Mānele are known to contain burials; they have also been home to nesting seabirds such ʻuaʻu kani. Though there was limited freshwater on the coast, elder kūpuna knew how to dive into the nearshore waters to find freshwater sources that seeped from cracks in the rocks.

The moʻolelo associated with Puʻupehe, an islet off the shore of Pālāwai, describe a number of cultural practices associated with the area. This includes: fishing for kala and aku in the clear waters of Kalulu; the cave of Malauea; the "great ravine" of Pālāwai and eating ʻuwaʻu bird baked in kī leaf with sweet pala fern root and ʻōhelo berries; the cool waters of Maunalei; catching ʻiʻiwi and scarlet ʻapapane birds in the Pulou ravine; the banana groves of Waiakeakua; baking honu in Malauea; and the burial ground of Mānele. According to one moʻolelo, when Puʻupehe died, she was wrapped in bright kapa and adorned in naʻu. Another moʻolelo connected to Puʻupehe and related by Fornander referenced the shark Puaiki, who traveled between Papawai on Maui and Mānele.

Pālāwai Ahupuaʻa was awarded to Chiefess Kekauʻōnohi during the Mahele and passed to her husband, Levi Haʻalelea, upon her death in 1851. A portion of LCA 10041, awarded to Kanekileia in the group claim under Lono et al. (Helu 10024 through 10058), lies within the Project Area. This parcel was known to contain a house site and sweet potato patch. Walter Murray Gibson purchased the ahupuaʻa of Pālāwai from Levi Haʻalelea in 1863. He and subsequent owners of these lands continued to consolidate private land ownership on Lānaʻi until the majority of the island was under a single fee-simple owner by the early 1900s.

In the Post-Contact period, this area was initially used for sheep and later transitioned into cattle ranching. The surrounding area was also used by the Hawaiian Pineapple Company until the final harvest in 1992. Under the Hawaiian Pineapple Company, Mānele Landing was a popular hangout for plantation families. Lele kawa (cliff diving) was a favored activity in Mānele, especially from the cliffs on the southwest side of the coastline at Leinohaunui. In the 1920s, Baldwin Ranch built a cattle chute near the Leinohaunui bluffs. In the 1930s, mortar salt beds were added to the landing at Mānele, though they were moved to the cliffs above the landing in 1943. The harbor was subsequently developed into the Mānele Small Boat Harbor during the 1960s and 1970s.

Previous ethnographic research related to Mānele and Pālāwai Ahupuaʻa emphasized fishing for akule and ʻōpelu, which were abundant at Mānele, and the presence of sharks in the bay. Some considered

the sharks part of their family and would not harm them. Families would travel across the island on established trails for seasonal fishing. One kupuna referred to the ocean as a "Hawaiian ice box," and noted that fishing at different spots throughout the year was a resource management practice that limited the chance for overfishing and long-term impacts to marine resources. Others recalled the 1951 pineapple strike that lasted seven months. During this time, the employees who were on strike completed many collective labor projects, including the development of the Mānele wading pool (also known as "Keiki Pond"), which was constructed through dynamite blasting followed by pick and shovel work.

3.9.1.5.2 Community Consultation

Prior to mailing out consultation letters for the Lānaʻi portion of the Project Area, Kepā Maly (Kumu Pono, LLC) was consulted to identify knowledgeable individuals that should be contacted. Letters were sent to referrals provided by Mr. Maly, as well as additional individuals identified through consulting the U.S. Department of the Interior NHO list, Aha Moku Council, and subsequent referrals. Email correspondence was maintained with Mr. Maly and the contacts he identified via a group email thread, including Pamela Alconcel, Benjamin Ostrander, Shelly Kaleialoha Preza, and Diane Preza. Via this email thread, the group shared that Mānele was a known burial area and that iwi kūpuna had been disturbed during previous projects at Mānele, including construction activities for the small boat harbor. The group identified the possible presence of iwi kūpuna in the Project Area as the primary concern. In addition, Mr. Maly shared a folder of resources on Mānele from his many years of working in the area. Glen Kila also responded via email and provided information regarding known archaeological sites in the vicinity.

3.9.1.6 Hawaiʻi Island Cable Landing Site

3.9.1.6.1 Background Research

The cable landfall on Hawaiʻi Island would be at Puhi Bay, in an area traditionally known as Milo or Puuhomilo. Portions of this area are DHHL lands and the entire region is connected with, and stewarded by, Keaukaha homesteaders. As such, it is an area with strong ties to past and ongoing Native Hawaiian cultural practices, valued resources, and beliefs.

The Hilo area in general is known for its frequent rains that provide ample freshwater and lush vegetation. This is reflected in the ʻōlelo noʻeau that reference the region, as well as boundary commission testimonies that make frequent reference to streams, grottos, waterholes, house sites, and cultivation plots. A variety of plants were grown, including kalo, yams (*Dioscorea* sp.), bananas (*Musa* sp.), kī, mamaki (*Pipturus albidus*), and niu. In areas where kalo could not be planted in loʻi, the kipi method of kalo planting was used, or kalo huli were submerged in water and held upright by lava rock mounds. Hilo was also a major area for ʻulu planting, which is further reflected by the moʻolelo of Ulu and Mokuola. A wide variety of fishing methods and gathering practices were employed in Hilo Bay. At least four different types of limu were available in the bay: limu ʻeleʻele, limu huluhuluwaena, limu kohu, and limu ʻakiʻaki. Fishponds cultivated ʻamaʻama, awa, ahole, and ʻoʻopu, and supported avifaunal species including koloa-maoli, ʻalae, kukuluāeʻo, and migratory pintail, widgeon, and

shoveler ducks. During the Kamehameha Dynasty, some of the fishponds in Waiākea were known as the “Royal Ponds,” and supplied mullet reserved for the King.

Several moʻolelo are connected with Milo, including the kupua heʻe that lived at the puʻu that used to be in Milo and would sometimes take one of the children who went to Puhi Bay to swim, and the shark ʻaumakua (Kaholeakāne) protecting the waters and people of Keaukaha. The legend of Laukaieie references subterranean waterways which extend inland from Milo to Kahiolo in the Panaʻewa forest, near the mauka edge of Honohononui and intersecting with the old Puna trail. The spring that emerged on the Milo side was an area where people would go to collect freshwater. A much-storied shark hole lies offshore at Puhi, sometimes referred to as Ka Lua Manō O Kaholeakāne. Akoi (1989) documented the practice of kahu hanai, feeding and caring for the shark, which began as early as the 1700s and continued at least into the 1930s. A small island at Puhi overgrown with hau contains the remnants of a stone structure interpreted by archaeologist Alfred Hudson as a burial vault, and re-identified as a heiau with probable associations to Kaholeakāne by cultural practitioners.

There are a number of LCA awards in the coastal region of Waiākea Ahupuaʻa, though none are located near the Project Area. The UH Hilo campus portion of the Project Area is in an area that was formerly under sugarcane cultivation for the Waiakea Mill Company. The PACRC portion of the Project Area is in an area that was set aside for the Keaukaha Beach Park by Executive Order 421, during the passage of the Hawaiian Homes Commission Act in 1920. In 1924, the Keaukaha-Panaewa Hawaiian Homestead followed the Hoʻolehua and Palaʻau Homesteads on Molokai to become one of the first Hawaiian Homesteads established. Akoi (1989) recorded firsthand knowledge of life in Keaukaha prior to and following the formal establishment of the Homestead. Keaukaha was a thriving community, and people sustained themselves with a variety of agricultural and fishing techniques.

Subsistence activities conducted in this area include fishing and gathering of ocean resources, swimming, hoʻomoana, large-scale organized camping activities, and other traditional cultural practices associated with nearshore areas. The splash zone at Puhi Bay was located as close as 10 feet from the shore and provided an important habitat for littoral resources like hāʻukeʻuke, wana, ʻopihi, kupeʻe, and pipipi. The fresh and brackish water ponds of Keaukaha likewise were home to valuable resource, like the “Hawaiian popcorn” ʻōhua fish. They also served as swimming holes and natural “refrigerators” to temporarily store resources gathered from the ocean.

3.9.1.6.2 Community Consultation

Three individuals with generational ties to and in-depth knowledge about Waiākea Ahupuaʻa were interviewed via Zoom – Dr. Halena Kapuni-Reynolds, Lokelani Brandt, and Dr. Lehua Veincent. Consultation participants emphasized that although the area has undergone significant development over the decades that have transformed the landscape, many traditional cultural practices continue today. Even the development of the sewage plant did not stop the community from cleaning up the area to make it suitable for fishing and swimming. Portions of Puhi Bay still contain limu ʻeleʻele, and canoe clubs like the Keaukaha Canoe Club also use this area for their activities. The beach in front of PACRC came to be known colloquially as Piggy’s Point, named after Uncle Piggy Kaleohano, who camped there every summer with his family. Puhi Bay is also a place where people scatter the ashes of

their loved ones. Many of the local schools also use Puhi Bay as an outdoor classroom extension for teaching and student activities.

As a portion of the Project Area lies within DHHL lands and will require an easement, a Beneficiary Consultation Meeting facilitated by DHHL was held at the Keaukaha Elementary School on July 8, 2025; the meeting was attended by roughly 20 individuals. Community members shared their frustrations with the current state of internet access in Keaukaha, which included limited connectivity and a high monthly cost. Those who attended the meeting were eager to see better internet access and connectivity as an outcome of this Project. It was clarified that HIFL would only address the middle mile infrastructure, and that it would be up to the providers who make use of the new fiber capacity to determine who and how they would service the area. Attendees also inquired about the safety of the fiber optic technology; the nature of the public-private partnership and potential benefits specific to OHA, DHHL, and Native Hawaiians; how those in Keaukaha would be able to access and benefit from this infrastructure; and whether the Project would be consulting with community members with regard to burial sites and cultural resources in the vicinity of the Project Area. They also stressed that it should be a priority to recruit first from the community and provide training opportunities so that local people and Native Hawaiians would be qualified for positions on the Project, rather than bringing people in from outside, which tends to have negative impacts on the community, including eliminating job opportunities and further increasing rent prices.

3.9.2 Potential Impacts and Mitigation Measures

Potential impacts to cultural resources that could result from construction and operation of the Project were identified through background research and the community consultation process. These results are detailed in the CIA and Ka Pa‘akai Analysis (Appendix I) and are summarized below, along with measures that would be implemented to mitigate potential impacts.

3.9.2.1 Kaua‘i Cable Landing Site

Access to Nukoli‘i Beach, potential impacts to wildlife, and potential impacts to archaeological resources were the primary concerns of CIA participants for the Kaua‘i cable landing site. Participants stressed the importance of access, both from the shore and from the ocean, including offshore waters, to allow for continued cultural practices and subsistence strategies that have been maintained for generations, such as canoe racing and fishing. As described in Section 2.5.7, public access to the shoreline and beach areas, as well as offshore waters, would be maintained throughout construction. Less than approximately one acre of the beach park (within the Project Area, as shown in Figure 3.1) would be cordoned off during construction; this area represents a fraction of the overall beach park and temporary closure of this area would not affect overall access to the beach and shoreline. Trenching along Kaua‘i Beach Road would temporarily affect traffic along the entrance road to the park; however, these impacts would be temporary and would be managed through implementation of traffic management measures (as further discussed in Section 3.14). Subsea cable laying activities would require the presence of a cable ship and support vessels in the nearshore waters with establishment of a buffer zone around cable installation activities; these activities would occur over a span of only a few days and would not require closure of any ocean waters. Consistent with the recommended measures listed in Section 3.9.3, the Project team would maintain communication and

work together with the local community, particularly the canoe clubs, to schedule and conduct construction in a manner that minimizes disruption of other activities at Nukoli‘i Beach. Once installed, all infrastructure associated with the cable landfall would be located at or beneath the ground surface and would have no bearing on public access.

Participants also raised concerns about potential impacts to marine wildlife, including, but not limited to the endemic Hawaiian monk seal and the endemic Hawaiian green sea turtle, both of which utilize the shoreline at Nukoli‘i Beach. Consistent with the recommended measures summarized in Section 3.9.3, and as further discussed in Section 3.6, the Project would implement agency-specified measures to avoid and minimize impacts to these species, should they occur.

CIA participants also stated that archaeological resources from both the pre- and post-Contact periods should be preserved and protected. Consistent with the recommended measures summarized in Section 3.9.3, and as further discussed in Section 3.8, consultation with SHPD/SHPO is ongoing in accordance with both state and federal historic preservation requirements and will be completed prior to Project implementation. Through this process, an AIS including subsurface testing is being conducted within the Project Area; all mitigation measures identified by SHPD/SHPO will be implemented as part of the Project.

A complete list of the measures that would be implemented to avoid and minimize impacts to cultural resources and traditional and customary practices is provided in Section 3.9.3. As the Project would maintain public access to and along the shoreline and ocean waters, incorporate measures to avoid and minimize impacts to marine wildlife, and mitigate for potential effects to historic properties (should any occur), no significant impacts to cultural resources are anticipated at the Kaua‘i cable landing site.

3.9.2.2 O‘ahu Cable Landing Site

The primary concern identified through community consultation for the O‘ahu cable landing site is the potential to encounter iwi kūpuna, and the importance of treating burials and other culturally significant resources with care and respect. Kālua were also identified as an important resource, with one CIA participant stating that these pits “are ancestral features tied to our identity as kānaka.” As previously discussed, consultation with SHPD/SHPO is ongoing in accordance with both state and federal historic preservation requirements and will be completed prior to Project implementation. Through this process, an AIS including subsurface testing is being conducted within the Project Area; the subsurface testing strategy, specifically designed to address the potential occurrence of iwi kūpuna and kālua, was developed in consultation with cultural descendants and is subject to approval by SHPD. All mitigation measures identified by SHPD/SHPO through the historic preservation review process would be implemented as part of the Project. Furthermore, consistent with the recommended measures summarized in Section 3.9.3, a Project-specific archaeological monitoring plan would be developed, including identification of areas with high cultural sensitivity that may warrant cultural monitoring during construction, as well as communications protocols, immediate protective treatment measures, and cultural protocols that would be implemented in the event of an inadvertent discovery.

Participants in the CIA and Ka Paʻakai Analysis also referenced other valuable resources that have been impacted by previous projects and warrant attention, including nearshore resources such as coral and limu, offshore fisheries, and groundwater underlying the limestone caprock. As detailed in Section 3.6, the Project has been specifically designed to avoid and minimize impacts to sensitive marine resources to the extent practicable; HDD would be used to install the cable under the shoreline such that no impacts to corals are anticipated at the Oʻahu cable landing site. Furthermore, HDD drilling plans have been developed based on site-specific geotechnical studies and an IDFR Contingency Plan would be implemented during drilling activities to avoid and minimize potential impacts to the surrounding environment, including groundwater.

A complete list of the measures that would be implemented to avoid and minimize impacts to cultural resources and traditional and customary practices is provided in Section 3.9.3. In particular, an AIS (including subsurface testing) is being completed and any mitigation identified through consultation with SHPD would be implemented as needed to avoid and minimize effects to historic properties (including iwi kūpuna and kālua); in addition, an archaeological monitoring plan would be developed and implemented during all ground disturbing activities. Furthermore, the Project would incorporate measures to avoid and minimize impacts to marine and other sensitive resources. Any Project-related studies and findings would be shared with the community to support ongoing community restoration efforts and other educational initiatives as appropriate. For these reasons, no significant impacts to cultural resources are anticipated at the Oʻahu cable landing site.

3.9.2.3 Maui Cable Landing Site

On Maui, access for people who use this area for fishing, canoe racing, and other traditional cultural practices, as well as potential adverse impacts to water quality due to possible contamination from runoff were the primary concerns identified through community consultation.

As described throughout this document, the Project would utilize HDD to install underground conduit between the harbor breakwater area and associated offshore punchout points, thus allowing the subsea cable to make landfall while traversing beneath and avoiding impacts to the shoreline. HDD operations would utilize a naturally occurring mud (e.g., bentonite) as a drilling fluid; bentonite is non-toxic but could temporarily increase turbidity in nearshore waters if a significant amount were to be released. The potential for accidental releases of drilling fluid into the environment would be minimized and mitigated through implementation of specific measures, as detailed in an IDFR Contingency Plan (Appendix D). In addition, as discussed in Section 2.5.1, the Project would include development and implementation of other site-specific plans, including best practices to minimize erosion and stormwater runoff to the surrounding environment.

During construction, no more than approximately one acre of land (within the Project Area, as shown in Figure 3.3) would be cordoned off during construction; this area represents only a portion of the western harbor breakwater and temporary use of this area would not be expected to affect access to the shoreline, boat ramp, harbor, or nearshore waters. Subsea cable laying activities would require the presence of a cable ship and support vessels in the nearshore waters with establishment of a buffer zone around cable installation activities; these activities would occur over a span of only a few days and would not require closure of any ocean waters. Consistent with the recommended measures

listed in Section 3.9.3, the Project team would maintain communication and work together with the local community, including any canoe clubs or other groups that utilize Kahului Harbor and the nearshore waters, to schedule and conduct construction in a manner that minimizes disruption of their regular activities. Once installed, all infrastructure associated with the cable landfall would be located at or beneath the ground surface and would have no bearing on public access.

A complete list of the measures that would be implemented to avoid and minimize impacts to cultural resources and traditional and customary practices is provided in Section 3.9.3. As the Project would incorporate an IDFR Contingency Plan and other best practices to minimize potential contaminants to the environment, would maintain public access to and along the shoreline and ocean waters, and would ensure adequate communication with the community prior to and throughout construction, no significant impacts to cultural resources are anticipated at the Maui cable landing site.

3.9.2.4 Molokai Cable Landing Site

The key concern identified through community consultation is potential disruption to the marine environment and impacts to marine ecosystems, including the nearshore and benthic environments, via the laying of cables and the potential effects of electromagnetic fields generated by the cables on marine life. These impacts were perceived in turn to affect Native Hawaiian rights to "access, protect, and sustain the marine resources that have nurtured us for generations" (Heen 2025, contained in Appendix I). This includes potential impacts to fisheries, traditional gathering practices, and the desecration of Kanaloa through intrusive activities in the marine environment.

As previously described, fiber optic subsea cables are widely used around the world for delivery of broadband and comprise a small-diameter (less than 1.1 inches) cable constructed of inert and non-toxic materials. The HIFL system would not require any power or electricity, such that the cable would not emit any electromagnetic fields or other emissions. The cable would be installed under the shoreline using HDD, an industry-standard approach used to minimize impacts to sensitive environments. HDD operations would utilize a naturally occurring mud (e.g., bentonite) as a drilling fluid; the potential for accidental releases of drilling fluid into the surrounding environment would be minimized and mitigated through implementation of specific measures, as detailed in an IDFR Contingency Plan (Appendix D). Beyond the HDD punchout, the cable would be surface laid on the seafloor; over time, it is expected that the cable would self-bury in areas of sandy or soft substrate.

As previously described, the Project would not restrict access to the beach, shoreline, or nearshore waters. Consistent with the recommended measures listed in Section 3.9.3, the Project team would maintain communication and work together with the local community, including any canoe clubs or other groups that utilize Molokai Yacht Club as well as the nearby shoreline and nearshore waters, to schedule and conduct construction in a manner that minimizes disruption of their regular activities.

A complete list of the measures that would be implemented to avoid and minimize impacts to cultural resources and traditional and customary practices is provided in Section 3.9.3. As the Project has been designed to involve minimal disruption of the marine environment, with measures incorporated to further minimize potential impacts, and would not restrict access along the shoreline or ocean waters,

with close communication maintained with the community throughout construction, no significant impacts to cultural resources are anticipated at the Molokai cable landing site.

3.9.2.5 Lānaʻi Cable Landing Site

Archival research and consultation identified Mānele as a permanent pre-Contact settlement, as well as a burial area. The primary concern identified through community consultation is the known presence of iwi kūpuna in the vicinity and the potential for the Project to encounter iwi kūpuna.

As detailed in Section 3.8, consultation with SHPD/SHPO is ongoing in accordance with both state and federal historic preservation requirements and will be completed prior to project implementation. Through this process, an AIS including subsurface testing is being conducted within the Project Area; the subsurface testing strategy, which specifically addresses the potential occurrence of iwi kūpuna, was developed in consultation with cultural descendants and is subject to approval by SHPD. All mitigation measures identified by SHPD/SHPO through the historic preservation review process would be implemented as part of the Project. Furthermore, consistent with the recommended measures summarized in Section 3.9.3, a Project-specific archaeological monitoring plan would be developed, including identification of areas with high cultural sensitivity that may warrant cultural monitoring during construction, as well as communications protocols, immediate protective treatment measures, and cultural protocols that would be implemented in the event of an inadvertent discovery.

With implementation of these and other measures to avoid and minimize impacts to cultural resources and traditional and customary practices, as listed in Section 3.9.3, no significant impacts to cultural resources are anticipated at the Lānaʻi cable landing site.

3.9.2.6 Hawaiʻi Island Cable Landing Site

Community consultation efforts identified a number of potential resources and practices which could be impacted by the Project. This included potential impacts to contemporary fishing practices, fresh and brackish water ponds, disruptions of hoʻomoana camping activities in the area, possible impacts to limu or limu collecting practices at Puhi Bay, interruptions of canoe club activities, disruption of memorial practices such as scattering of ashes, and impacts to educational activities. There was also significant concern expressed over drilling and trenching in the ocean, and the potential impacts this could have on fragile ocean ecosystems. Community members also expressed concerns about the safety of the fiber cable, and potential hazards of damaging or otherwise impacting the cable. Participants wanted to make sure the Project would not interfere with the County's planned improvements to sewage treatment infrastructure. They also expressed a desire to see local people hired for the project wherever possible and noted that bringing in outside labor can have deleterious consequences for local communities, including driving up rent prices.

These concerns and potential impacts have been incorporated into the Project design development process and will be further addressed through implementation of measures to avoid and minimize impacts to cultural resources and traditional and customary practices as listed in Section 3.9.3. As previously described, the Project has been specifically designed to avoid and minimize impacts to marine and other sensitive resources to the extent practicable. HDD would be used to install underground conduit thus allowing the cable to make landfall, while specifically avoiding impacts to

the shoreline as well as the county's wastewater infrastructure. HDD drilling plans have been developed based on site-specific geotechnical studies and an IDFR Contingency Plan would be implemented during drilling activities to minimize potential impacts to the surrounding environment. Beyond the HDD punchout, the cable would be surface laid on the seafloor. While the cable would be preferentially laid in sand channels, it would need to traverse certain areas with high coral cover. Some corals would be impacted during cable installation; however, it is anticipated that impacted corals would recolonize and no permanent loss would occur. While the potential impacts to corals are not expected to be significant, it is recognized that corals are a valued resource. As such, the Project would incorporate efforts to provide benefits related to the coastal environment within or near the Project Area as a means to offset the effects of cable installation, in coordination with the resource agencies and the community. Also as previously described, the Project would not restrict access to the shoreline or nearshore waters. Consistent with the recommended measures listed in Section 3.9.3, the Project team would maintain communication and work together with the local community, including any canoe clubs or other groups that utilize the Keaukaha shoreline, to schedule and conduct construction in a manner that minimizes disruption of their regular activities.

With implementation of these and other measures to avoid and minimize impacts to cultural resources and traditional and customary practices, as listed in Section 3.9.3, no significant impacts to cultural resources are anticipated at the Hawai‘i Island cable landing site.

3.9.3 Ka Pa‘akai Analysis

As previously described, the Ka Pa‘akai Analysis is based on an analysis framework established by the Hawai‘i Supreme Court to assist the state in fulfilling its constitutional obligation to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua‘a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the state to regulate such rights" (Article XII, Section 7 of the Constitution of the State of Hawai‘i). The framework specifies the analysis identify: (1) the identity and scope of valued cultural, historical, or natural resources, including the extent to which traditional and customary native Hawaiian rights are exercised in the [petition] area; (2) the extent to which those resources (including traditional and customary native Hawaiian rights) would be affected by the proposed action, and (3) feasible actions, if any, to reasonably protect native Hawaiian rights if they are found to exist. Following is a summary of the Ka Pa‘akai Analysis for the HIFL Project; additional detail is provided in Appendix I.

3.9.3.1 Traditional Cultural Resources, Practices, and Beliefs

The cable landing sites are situated in coastal locations on each of the six main Hawaiian Islands. These sites and their immediate surroundings are known as areas used for traditional habitation, burial, subsistence, and other cultural activities. In many of these locations, trails connected the coastline with the uplands and surrounding areas. Oral accounts of the botanical landscapes include niu, mokihana, fields of pili grass, ‘ōhelo berries, pala fern, and kī. Cultivation of ‘uala, noni, kou, hala, wiliwili, yams, and lo‘i kalo occurred throughout portions of the Project Area. Animals noted in these areas included ‘uwa‘u, ‘i‘iwi, and ‘apapane. The Kaua‘i, O‘ahu, Maui, and Lāna‘i cable landing sites are

in areas that are known to contain burials nearby, particularly in sandy dunes or kālua. Some of these areas are also home to nesting seabirds, such as ʻuaʻu kani.

Moʻolelo describe areas within or near several of the cable landing sites as good canoe landing places. Various forms of fishing and marine resource gathering were identified as a significant part of traditional use of the coastal landscape. Traditional accounts mention the following fishes and aquatic resources: aloalo, kala, aku, honu, limu ʻeleʻele, limu huluhuluwaena, limu kohu, and limu ʻakiʻaki. Sharks were also discussed in various areas, particularly as ʻaumakua that protected the people and waters. Some also practiced kahu hanai, feeding and caring for the sharks. Fishponds near portions of the Project Area, such as Kaunakakai (Molokai), emphasize the practice of fishing for subsistence. Fishponds were used to cultivate ʻamaʻama, awa, ahole, and ʻoʻopu and supported avifaunal species such as koloa-maoli, ʻalae, kukuluāeʻo, and migratory pintail, widgeon, and shoveler ducks. In locations with limited freshwater on land such as Mānele (Lānaʻi), elder kūpuna knew how to dive into the nearshore waters to find freshwater sources that seeped from cracks in the rocks.

Post-Contact land uses across the Project Area included large-scale sugarcane and pineapple cultivation, sheep and cattle ranching and dairy farming, and military use. Industrial and recreational development, such as the development of a racetrack, the installation and use of an airfield, resort development near Nukoliʻi Beach (Kauaʻi), the building of a wastewater treatment facility in Keaukaha (Hawaiʻi Island), and the development of harbors and dredging for landings across multiple islands had deleterious impacts on traditional cultural practices in many areas. Nonetheless, cultural practices such as gathering of marine resources, fishing, and canoe racing have endured.

Previous ethnographic research highlights the importance of gathering resources such as hāʻukeʻuke (edible sea urchin), kupeʻe, pipipi limu, limu kohu, limu wawaeʻiole, pili grasses, wild spinach, ʻōhua and ʻopihi; spearfishing, reef fishing, throw net fishing, and other types of fishing; catching lobster, heʻe, and ʻoʻopu; crabbing; diving; lele kawa (cliff diving) and kilo (or spotting) for akule and catching ʻōpelu. Previous studies also identified coastal salt pans, freshwater resources, and limestone pit features. Fresh and brackish ponds near shore also served as fishing holes or natural refrigerators to temporarily store resources gathered from the ocean. Participants in previous CIAs described seasonal fishing and fishing at different spots throughout the year as a resource management practice that limited the chance for overfishing and long-term impacts to marine resources. Participants in those studies also stressed the importance of various coastlines as burial areas.

Participants in the consultation process for this Project emphasized the continued importance of launching canoes and utilizing coastal areas for recreation, including surfing, diving, swimming, paddling, canoe races, camping, and fishing. Participants stressed the importance and responsibility to mālama the marine ecosystems and natural and cultural resources of the area, including protection of native wildlife, environmental health, and archaeological sites and features, both on and offshore. This includes fisheries, limu, and coral as well as unique geomorphological features in the area. Specific species identified for protection include ʻōpaeʻula, ʻakoko, and ʻEwa hinahina. Participants also mentioned protecting freshwater resources both above and below ground, located in limestone pits or subterranean water.

Participants emphasized the importance of living cultural landscapes, with descendants and practitioners continuing to perpetuate, revive, and build on long-standing traditional cultural practices. Participants noted that extensive development in and around various portions of the Project Area have limited their ability to practice traditional cultural practices including fishing, gathering limu, and maintaining ʻauwai systems. The shift away from seeking food from land-based resources to relying on imported goods has also impacted traditional practices and care for the landscape. However, despite all these changes, participants stated their communities still show up to maintain coastal areas to make them suitable for their continuing cultural practices, such as fishing and swimming. Participants highlighted the potential for iwi kūpuna in the Project Area, and the need to treat them with respect.

3.9.3.2 Potential Impacts to Traditional Cultural Resources, Practices, and Beliefs

Based on the background research and input received through consultation for the CIA and Ka Paʻakai Analysis, potential impacts to cultural resources and practices could result from Project construction and installation of the cable. Based on the resources and traditional practices identified by participants for various portions of the Project Area, the Project has the potential to impact subsurface cultural resources, including burials, that may be present in the Project Area as well as the marine environment, including coral ecosystems, wildlife, freshwater and brackish ponds, and benthic habitats. Subsistence-based activities and recreational activities in the nearshore environment also have potential to be affected.

Given the coastal location of each cable landing site, potential impacts include the ability of communities and practitioners to access the shoreline and beach during and after construction, from the shore, the water, and the offshore waters. This includes the launching and landing of canoes, recreational activities, fishing, harvesting nearshore resources such as shellfish and limu, and marine rescue operations.

Construction-related activities and the cable itself could have impacts on the surrounding environment. Drilling and cable-laying could impact marine ecosystems, which is the realm of Kanaloa and an important part of the cultural landscape. Participants expressed a desire for the Project to consider and select the least impactful method for cable installation. Participants observed that nearshore resources, especially coral and limu, have been impacted by previous projects whose activities included water diversion, pollution, and/or runoff, and that any impacts on these baseline resources would likely carry up into broader negative consequences for entire marine ecosystems. Marine wildlife, including but not limited to the endemic Hawaiian monk seal and Hawaiian green sea turtle, as well as offshore resources including the traditional fisheries, also warrant careful consideration and protection from Project-related impacts. Other construction-related impacts could occur as a result equipment staging, trenching and excavation, and other onshore activities. For example, participants identified the presence of underground water resources, and stressed that the Project should take care to avoid detrimental impacts to this resource and the ecosystems that depend on it. Emergencies during construction could release contaminants, which could also affect the surrounding environment and those who utilize these resources. Participants advocated for

maintaining transparency and communicating information to the community throughout the duration of the project, and particularly in the event of an emergency.

An additional potential impact is the possibility of encountering subsurface cultural resources, including burials, during Project construction. Participants stressed the importance of thorough archaeological investigations as well as treating burials and other culturally significant resources with care and respect. Participants noted that burials have been previously disturbed in the vicinity of some of the coastal portions of the Project Area and expressed concern over any further disturbances. Participants requested that archaeological resources from both the pre- and post-Contact periods be preserved and protected.

While there are concerns that the project could impact access and cultural resources, it could also provide benefits to local communities that struggle with limited broadband connectivity and high monthly costs. While expressing support for improved access, concerns were raised about bringing in labor from outside of Hawai‘i, as this takes away potential job opportunities and can drive up rent prices for the local community. Participants noted that the Project should seek to provide benefits for Native Hawaiians, especially if the Project involves leasing of Crown Lands. Participants also recommended that the Project team maintain open and transparent communication with the communities within which the Project will be situated.

3.9.3.3 Measures to Reasonably Protect Traditional Cultural Resources, Practices, and Beliefs

Feasible actions that have been identified to reasonably protect traditional cultural resources, practices, and beliefs, and would be implemented as part of the Project, are listed below. While certain measures may be responsive to community concerns at individual cable landing site(s), these measures are applicable to the Project as a whole and would be implemented across all six cable landing sites.

- Ensure access to the beach, shoreline, and nearshore waters is maintained and not hindered at any time during construction. Work collaboratively with local users, such as fishermen and canoe clubs, to schedule and conduct Project-related work in a manner that avoids or minimizes disruption of their activities.
- Designate a point of contact responsible for ongoing communication and consultation with the community specific to each cable landing site regarding Project activities, potential impacts, and the construction schedule. Ensure communication is effective and transparent, continues throughout construction, and clearly addresses questions and concerns raised by community members.
- Take appropriate precautions to protect marine wildlife and avoid impacts to the marine ecosystem, including measures to address run-off and prevent the introduction of pollutants into the nearshore environment.
- Support ecosystem restoration for sensitive resources, such as limu, coral, and native plants, if needed to offset potential impacts.

- Comply with all SHPD requirements regarding archaeological resources to ensure impacts are adequately avoided and/or mitigated.
- Develop a Project-specific archaeological monitoring plan, in consultation with SHPD, including site-specific protocols to be followed in the event of an inadvertent discovery of iwi kūpuna or other culturally significant materials. The plan should define areas of highest potential cultural sensitivity that may warrant the implementation of cultural monitoring during construction, as well as establish communications protocols, immediate protective treatment measures, and cultural protocols in the event of an inadvertent discovery. If discovered during construction, iwi kūpuna and other culturally significant materials should be treated with care in accordance with the law and Native Hawaiian traditions.
- Share Project-related studies and findings with the community and broader public to support ongoing community restoration efforts and other educational initiatives.

3.10 Air Quality

3.10.1 Affected Environment

The air quality in the state of Hawai‘i is ranked as some of the best in the U.S., primarily because of the consistent trade winds that pass through the islands and the relatively limited emission sources on the various islands. The main sources of pollutant air emissions at each cable site are associated with vehicles on adjacent roadways and highways, as well as commercial and industrial activities on nearby properties.

Under the authority of the Clean Air Act, the Environmental Protection Agency (EPA) has established nationwide air quality standards to protect public health and welfare. These federal standards, known as National Ambient Air Quality Standards (NAAQS), represent the maximum allowable atmospheric concentrations for six criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone, lead, and particulate matter (respirable particulate matter less than or equal to 10 micrometers in diameter [PM_{10}] and respirable particulate matter less than or equal to 2.5 micrometers in diameter [$PM_{2.5}$]). The NAAQS are based primarily on evidence of acute and chronic (or short-term and long-term) health effects and apply to outdoor locations to which the general public has access. Primary standards relate to limits for protection of public health; secondary standards relate to limits for protection of public welfare (e.g., decreased visibility; damage to animals, crops, and vegetation). Based on measurements of ambient criteria pollutant data, the EPA designates areas as having air quality equal to or better than NAAQS (attainment) or worse than NAAQS (non-attainment).

Pursuant to HRS Chapter 342B, the Clean Air Branch of the HDOH is responsible for implementing air pollution control in the State and has established Hawai‘i ambient air quality standards (HAAQS), which in some cases are more stringent than the comparable federal standards or address pollutants that are not covered by the federal standards. In addition to the six federal criteria, the state has also established a state ambient air standard for hydrogen sulfide. The HAAQS are based primarily on health effects data, but also reflect other considerations, such as protection of crops, protection of materials, or avoidance of nuisance conditions (such as objectionable odors).

The HDOH and EPA maintain a network of air quality monitoring stations throughout the islands. In 2023, a total of 17 air monitoring stations were maintained statewide; these include one station on Kauaʻi (to monitor the impacts of cruise ships), four stations on Oʻahu (to measure the emissions from commercial, industrial, and transportation activities), two stations on Maui (to measure impacts of agricultural burning and wildfires), with the remainder on Hawaiʻi Island (to monitor emissions from the volcano and geothermal energy production). Air quality monitoring data collected from these monitoring stations indicate that criteria pollutant levels remain consistently below the ambient federal and state air quality standards and are thus in attainment of all NAAQS and HAAQS[20] (HDOH CAB 2024).

3.10.2 Potential Impacts and Mitigation Measures

Construction of the Project would result in short-term impacts to air quality, primarily as a result of exhaust from construction equipment as well as fugitive dust particles from soil disturbance and other similar construction activities. Exhaust emissions would be generated by the cable ship and support vessels, heavy construction equipment and vehicles, trucks delivering construction materials and Project components to the site, and vehicles used by construction workers commuting to and from the Project Area. These activities would result in emissions of air pollutants including CO_2, nitrogen oxides, sulfur oxides, PM_{10}, and $PM_{2.5}$.

Emissions would occur over the approximately 3 to 4-month construction period per cable landing site, with potential impacts generally limited to areas within and immediately surrounding the Project Area. Given the nature of the construction activities, the emissions would be temporary, intermittent, and localized in nature. In comparison to overall emissions in the region, these contributions are relatively small and would not be expected to affect attainment of the federal or state ambient air quality standards.

State law (HAR Section 11-60.1) requires that the best practical operation or treatment be implemented during construction activities such that there is not discharge of visible fugitive dust beyond the property lot line. To comply with these requirements and to minimize any other adverse effects on air quality, the BMPs listed below would be implemented as part of the Project. With implementation of these BMPs, construction-related impact to air quality are expected to be less than significant.

- All vehicles and equipment used for the Project would be properly maintained according to manufacturer's specifications and in compliance with applicable emissions standards.
- To the extent feasible, off-road and portable diesel powered equipment, including but not limited to bulldozers, graders, cranes, loaders, scrapers, backhoes, generator sets, compressors, auxiliary power units, would be fueled with motor vehicle diesel fuel.
- Vehicles and equipment would not be allowed to idle for extended periods of time (i.e. more than 20 minutes).

[20] The monitoring stations near Kilauea volcano on Hawaiʻi Island regularly exceed the NAAQS for SO_2 and occasionally exceed the NAAQS for $PM_{2.5}$. The volcano is considered a natural, uncontrollable event; therefore, the State requests exclusion of these exceedances from the determination of attainment.

- Measures to control fugitive dust within and around the Project Area (such as watering the area to reduce dust movement, installation of dust screens, and use of gravel for temporary travel-path surfaces instead of dirt) would be implemented as needed.
- All trucks hauling soil or other loose materials would be covered.
- Carpooling among construction workers would be encouraged to minimize construction-related traffic and associated emissions.

Following construction, areas that have been temporarily disturbed would be restored to their pre-existing condition to minimize the potential for erosion and fugitive dust. Operation of the Project would result in negligible emissions associated with routine testing and occasional use of the backup generator at most cable landing sites, as well as vehicle exhaust and fugitive dust from vehicles and equipment used to perform operation and maintenance activities. With the exception of the emergency generators, none of the other Project components (e.g., subsea cable, BMH, terrestrial cable, or CLS equipment) emit air pollutants of any kind. Consequently, it is anticipated that emissions associated with Project operations and maintenance would be very low and would not result in exceedance of the NAAQS/HAAQS or otherwise significantly affect air quality.

3.11 Noise

3.11.1 Affected Environment

Noise is generally defined as an unwanted or disturbing sound that interferes with normal hearing, communication, or the enjoyment of a quiet environment. The degree of audibility of a new or modified sound source is dependent in large part upon the relative level of the existing acoustic environment.

The State of Hawai‘i has adopted statewide noise standards, set forth in HAR Section 11-46; these are administered by the Indoor and Radiological Health Branch of HDOH. The stated purpose of the standards is to “provide for the prevention, control, and abatement of noise pollution in the state from the following noise sources: stationary noise sources (such as air-conditioning units, exhaust systems, generators, compressors, and pumps); and equipment related to agricultural, construction, and industrial activities.” Sound from ongoing maintenance activities is considered part of routine operation and the combined total of ongoing maintenance and routine operation are subject to the sound level limits. Sound from construction and the occasional, major equipment overhauls during operations and maintenance is regulated as construction activity.

The noise standards are the maximum permissible sound levels, as measured at the property line, and vary according to underlying zoning district. The daytime and nighttime maximum permissible sound levels for the three classes of receiving zoning districts, provided in A-weighted decibels (dBA), are summarized in Table 3-12. For mixed zoning districts, the primary zoning designation is used to determine the applicable zoning district class.

Table 3-12. State of Hawai'i Maximum Permissible Sound Levels by Zoning District

Receiving Zoning Class District	Maximum Permissible Sound Level (dBA)	
	Daytime (7:00 AM – 10:00 PM)	Nighttime (10:00 PM – 7:00 AM)
Class A Zoning District (includes all areas equivalent to land zoned residential, conservation, preservation, public space, or similar type)	55	45
Class B Zoning District (includes all areas equivalent to lands zoned for multi-family dwellings, apartment, business, commercial, hotel, resort, or similar type	60	50
Class C Zoning District (includes all areas equivalent to lands zoned agriculture, country, industrial, or similar type)	70	70

Source: HAR Section 11-46, "Community Noise Control"

Pursuant to HAR Section 11-46-4, the maximum permissible sound levels for stationary noise sources and equipment related to agricultural, construction, and industrial activities, as listed in Table 3-12, apply to any excessive noise source emanating within the specified zoning district and at any point at or beyond the property line. Noise levels may not exceed the maximum permissible sound levels for more than ten percent of the time within any 20 minute period, except with issuance of a permit or variance.[21,22] Factors that are considered in granting of a permit or variance include whether the activity is in the public interest and whether the best available noise control technology is being employed.

The applicable receiving zoning class district per HAR Section 11-46, based on the primary zoning designation for each cable landing site is provided in Table 3-13.

Table 3-13. Applicable Noise Standards

Cable Landing Site	Cable Landfall		CLS	
	Primary Zoning District	Receiving Zoning Class District	Primary Zoning District	Receiving Zoning Class District
Kaua'i	Agriculture	Class C	University	Class A
O'ahu	General Preservation	Class A	Industrial	Class C
Maui	Conservation	Class A	Residential	Class A
Molokai	Interim	Class A (assumed)	Public/Quasi-Public	Class A
Lāna'i	Project District	Class A (assumed)	Business Country Town	Class B
Hawai'i Island	Open	Class A	University	Class A

[21] Exceptions include operation of an emergency generator, when installed and used as required and necessary for the protection of public health and safety, provided the best available control technology is implemented (HAR Section 11-46-5(4).

[22] Permits allow for exceedance of the maximum permissible sound levels except during designated times (e.g., before 7am and after 6pm Monday through Friday; before 9am and after 6pm Saturday; anytime on Sundays or holidays).

3.11.1.1 Kaua‘i

Ambient noise in the immediate vicinity of the cable landfall is associated with recreational activities within the beach park, vehicular traffic on nearby roadways (including Kaua‘i Beach Road, Kaua‘i Beach Drive, and Kūhiō Highway), as well as the ocean and other environmental sounds. Other nearby sources of noise include a variety of commercial, industrial, and recreational uses. As described in Section 2.4.1, the Outrigger Kaua‘i Beach Resort is located approximately 0.2 miles to the north, beyond which is the Wailua Motocross Track and Wailua Golf Course. A roadside agricultural vendor and industrial property are located approximately 0.4 mile to the southwest. The nearest residential property is located further south, approximately 0.8 miles from the Project Area.

Ambient noise in the vicinity of the CLS site is associated with educational activities within the KCC campus and vehicular traffic on Kaumuali‘i Highway (a four-lane divided highway). Other nearby sources of noise include various other educational, residential, and commercial activities. The nearest residential properties are located approximately 0.1 miles to the south (across Kaumuali‘i Highway).

3.11.1.2 O‘ahu

Ambient noise at the O‘ahu cable landfall is associated with a mixture of natural and man-made sources. In the immediate vicinity of the cable landfall, sources of noise include recreational users of Barbers Point Beach Park, vehicular traffic on ‘Ōla‘i Street, as well as the ocean and other environmental sounds. Other nearby land uses which contribute to ambient noise levels include the adjacent commercial activities associated with Germaine’s Luau, extensive industrial activities throughout Campbell Industrial Park, as well as air traffic associated with Kalaeloa Airport (located approximately 1.5 miles to the east). There are no nearby residential properties or other noise sensitive receptors proximate to the proposed cable landfall.

3.11.1.3 Maui

Ambient noise in the immediate vicinity of the cable landfall on Maui is associated with recreational and other similar activities on the western breakwater area, moderate to heavy vehicular traffic along Kahului Beach Road, commercial and industrial activities associated with Kahului Harbor, as well as the ocean and other environmental sounds. Noise sensitive receptors in the vicinity of the Project Area include Keōpūolani Regional Park and Maui Arts & Cultural Center, located just west and southwest of Kahului Beach Road, and nearby residences; the nearest residential property is located approximately 0.1 miles northwest of the Project Area.

Ambient noise in the vicinity of the CLS site is associated with educational activities within the UH Maui College campus and vehicular traffic on Wahinepio Avenue. Other nearby sources of noise include various other educational, residential, and commercial activities. The nearest residential properties are located approximately 0.1 miles to the south (across West Ka‘ahumanu Avenue).

3.11.1.4 Molokai

Ambient noise near the cable landfall on Molokai is related to moderate vehicular traffic on Mauna Loa Highway, harbor-related activities at Kaunakakai Wharf, as well as nearby industrial and recreational

activities. Noise sensitive receptors in this vicinity include Malama Cultural Park and recreational users along the shoreline. The nearest residential properties are located approximately 0.2 miles to the northeast (along Manako Lane).

Ambient noise in the vicinity of the CLS site is very similar to that of the cable landfall since it is located approximately 0.7 miles southeast of the cable landfall. Ambient noise sources in the vicinity of the CLS include moderate vehicular traffic on Mauna Loa Highway and Alanui Kaimike Street, and nearby recreational and residential uses. Nearby noise sensitive receptors include recreational areas such as Duke Maliu Regional Park, educational institutions like Kaunakakai Elementary School, and residences. The closest residences are immediately across Mauna Loa Highway.

3.11.1.5 Lānaʻi

Ambient noise in the vicinity of the Lānaʻi cable landfall is associated with a mixture of natural and man-made sources, including light vehicular traffic on Mānele Road, commercial and recreational activities at Mānele Small Boat Harbor, as well as the ocean and other environmental sounds. Nearby noise sensitive receptors include recreational areas and resort facilities.

3.11.1.6 Hawaiʻi Island

Ambient noise near the Hawaiʻi Island cable landfall in Hilo includes onsite activities associated with PACRC, moderate vehicular traffic on Kalaniana‘ole Street, commercial and industrial uses at Hilo Harbor, as well as air traffic associated with Hilo International Airport. Nearby noise sensitive receptors include recreational users along the shoreline and nearby residences. The nearest residential properties are immediately across Kalaniana‘ole Street.

Ambient noise in the vicinity of the CLS site is associated with educational activities within the UH Hilo campus, light vehicular traffic on West Lanikāula Road and other local streets, as well as air traffic for the Hilo International Airport. Nearby noise sensitive receptors include university and educational facilities, housing, religious and other civic institutions.

3.11.2 Potential Impacts and Mitigation Measures

Project-related construction activities would generate noise that would likely exceed local ambient noise levels and affect nearby areas, including noise-sensitive receptors as described above. Each cable landfall would require use of specialized heavy equipment for the HDD drilling, including a drill rig, pumps, drilling fluid separation unit and other auxiliary equipment. Other equipment, such as an excavator, dump truck, loader, and crane would be needed for excavation and installation of the BMH as well as trenching for the terrestrial cable. Overall, the HDD drill rig is expected to be the dominant sound source and may generate elevated sound levels over the duration of use, which is generally expected to be approximately 2-6 weeks per site. Similarly, construction of the CLS at sites involving new modular structures or other associated construction activities (i.e. Kauaʻi, Maui, Molokai, Hawaiʻi Island) would require use of heavy equipment for excavation and installation of foundations, placement of the CLS structures, and trenching for the terrestrial cable and interconnection with other utilities. Those sites involving use of space in existing buildings (e.g., Oʻahu, Lānaʻi) would not require the use of any heavy equipment or other noise-generating activities.

Noise levels resulting from construction activities vary greatly depending on the type of equipment, the specific equipment model, the operations being performed, and the overall condition of the equipment. Table 3-14 lists the type of construction equipment that is likely to be used for construction and the anticipated noise levels associated with the equipment based on reference information from the EPA and the Federal Highway Administration (FHWA) Construction Noise Handbook (FHWA 2006). It is assumed that Project equipment will have similar sound profiles as those considered in this assessment; however, it is possible that the final equipment manufacturers, models, and therefore expected sound profiles may vary.

Table 3-14. Summary of Anticipated Construction-Related Noise

Construction Activity	Construction Equipment	Load Factor %	Maximum Lmax Equipment Noise Level at 50 ft (dBA)	Composite Leq Noise Level at 1000 ft (Average Daytime dBA)
HDD and Beach Manhole	Drill Rig and Power Unit	N/A	102	76
	Drilling Mud Mixer/Recycling Unit	N/A	90	64
	Mud Pumping Unit	N/A	102	76
	Generator Set, 100 kilowatts	N/A	100	74
	Generator Set, 200 kilowatts	N/A	102	76
	Vertical Sump Pump	N/A	75	49
	Excavator	N/A	102	76
	Dump Truck	N/A	90	64
	Loader	N/A	102	76
Terrestrial Cable	Rubber Tracked Excavator	40	85	55
	Skid Steer	40	85	55
	Loader	40	80	50
	Dump Truck	40	85	55
	Compactor	40	70	40
	HDD Drill Rig - Mini	40	80	50
CLS	Medium Track Excavator	40	85	55
	Skid Steer/Loader	20	80	47
	Generator	20	84	51
	Crane (to place/set modular CLS)	40	85	55

Based on the construction-related noise levels listed in Table 3-14, it is anticipated that Project-related construction noise levels would exceed ambient levels, potentially in excess of the maximum permissible sound limits specified in HAR Section 11-46. The actual noise levels that would be generated during construction would depend on the construction methods employed during each phase of the construction process. Actual received sound levels would fluctuate, depending on the construction activity, equipment type, and separation distances between source and receiver. Construction-related traffic, such as trucks traveling to and from the Project site on public roads, would also generate noise and contribute to overall sound levels; however, as discussed in Section 3.14, construction-related traffic would be minimal. Traffic-related noise generated by the Project would be short-term and comparable to existing noise levels along the local road network.

As construction-related noise is expected to be audible in adjacent areas surrounding the various cable landing sites, potentially in exceedance of the maximum permissible sound levels, the Project would cause a temporary and short-term disturbance. Reasonable efforts would be made to minimize the noise levels associated with Project construction to the extent practicable, including measures such as those listed below. Furthermore, a noise permit and/or variance would be obtained from HDOH in compliance with HAR Section 11-46, as necessary. As construction noise would be temporary in nature, and with implementation of the measures listed below, no long-term or otherwise significant noise impacts are anticipated as a result of Project construction.

- Construction activities would be scheduled to minimize noise-generating activities during evening and weekend hours to the extent feasible. Noise-generating activities would be grouped to occur at the same time to minimize the duration of peak noise levels to the extent feasible.
- Engineering controls such as acoustic enclosures and sounds barriers would be incorporated into the work, where feasible.
- Construction site and access road speed limits would be established and enforced during the construction period.
- Electrically-powered equipment will be used instead of pneumatic or internal combustion powered equipment, where feasible.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas would be located as far as practicable from noise-sensitive receptors.
- The use of noise-producing signals, including horns, whistles, alarms, and bells would be for safety warning purposes only.
- No Project-related public address or music system would be audible at any adjacent receptor.
- All noise-producing construction equipment and vehicles using internal combustion engines would be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed “package” equipment would be equipped with shrouds and noise control features that are readily available for that type of equipment.

Once construction of the Project is complete, the cable landfall infrastructure would be located at or below ground and would not generate any appreciable noise. Operational noise would generally only occur at the CLS facilities. Each CLS would consist of either space in an existing building or an unmanned utility structure containing submarine line terminating equipment, cross connect equipment, climate control equipment (i.e. HVAC), and power and control systems. Some of the CLS facilities (Kauaʻi, Maui, Molokai, and Hawaiʻi Island) would also include an external generator installed on a concrete pad; the generator would only be used as needed to provide back-up power during emergencies (with occasional testing to ensure readiness).[23] As generator use would be limited to

[23] Emergency generators are exempt from community noise control standards pursuant to HAR Section 11-46-5(4).

atypical operating conditions, the only sound source during normal operations is expected to be the HVAC system. Sound from HVAC units is related to fans and airflow turbulence. Sound power level ratings can vary depending on the model selected, typically from approximately 80 to 100 dBA; however, measures (such as acoustic hoods, louvers, silencers, and enclosures) can be implemented to reduce HVAC-related noise. With implementation of these measures as needed, operational sound levels at noise sensitive receptors as a result of the CLS facilities would be expected to remain at a low level, such that no significant noise-related impacts are anticipated.

3.12 Utility Infrastructure

3.12.1 Affected Environment

3.12.1.1 Offshore Utility Infrastructure

A wide variety of subsea cables – including in-service, out-of-service, and retired cables, cross the world's oceans. As described in Section 1, subsea cable infrastructure is a critical component of global telecommunications and internet connectivity. Given Hawai'i's strategic location between Asia and North America, it serves as a critical hub for subsea cables in the Pacific. Multiple subsea cable landings, particularly on O'ahu, provide key infrastructure for global and regional connectivity. In addition, many of the oldest telegraph cables, some of which were installed over 150 years ago, still lie on or below the seabed. Other typical offshore utility infrastructure includes power lines, gas or water pipelines, and wastewater or effluent outfalls.

As part of the Project design and pre-development process, relevant databases and records were reviewed to identify both in-service and out-of-service cables, including nautical charts maintained by the NOAA Office of Coast Survey as well as information obtained from applicable cable system owners. Table 3-15 summarizes the in-service and out-of-service cable and other infrastructure crossings identified through these efforts. Furthermore, consultation with the Department of Defense (DoD) was conducted to identify any seabed assets that are not plotted on public-facing nautical charts.

Table 3-15. Submarine Cable Crossing Summary

HIFL Route Segment	In-Service Crossing	Out-of-Service Crossing
Segment 1	8	9
Segment 2A	3	0
Segment 2B	3	0
Segment 2.1	7	3
Segment 2.2	2	0
Segment 2.3	0	0
Segment 3	1	0

The crossing of existing offshore cables is a routine matter in the design and installation of subsea cable systems. Regardless, the proposed cable route has been designed to avoid existing cable

crossings to the extent practicable, and to minimize impacts where crossings are unavoidable. All known pipelines and outfalls have been avoided through Project siting and design.

3.12.1.2 Electricity and Telecommunications

Each island is served by an electric utility company, which owns and maintains an island-wide transmission and distribution system for delivery of electrical service to customers. Kauaʻi Island Utility Cooperative (KIUC) owns and operates the system on Kauaʻi; Hawaiian Electric Company and its affiliates – Maui Electric and Hawaiʻi Electric Light Company – own and operate the systems on Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Island, respectively. In general, each of these systems includes a network of overhead and underground lines, many of which are within established roadway corridors. Fiber optic and copper telecommunications facilities, owned by various telecommunications companies, are commonly co-located on joint-use utility poles in accordance with applicable utility standards and safety codes.

Each of the cable landing sites are located in areas served by these local utilities, with existing overhead and/or underground electrical and telecommunication infrastructure located within the Project Area. As detailed in Section 2, the Project would contract with a licensed utility on each island to utilize fiber on their existing utility network, as a means to connect the cable landfall infrastructure to the CLS facility for each cable landing site.

3.12.1.3 Water

Each of the main Hawaiian Islands is served by a water supply and distribution system, which is generally comprised of a network of surface water intakes and groundwater wells, treatment facilities, storage tanks and reservoirs, and transmission and distribution mains. The water systems on Kauaʻi, Oʻahu, Maui, Molokai, and Hawaiʻi Island are owned and operated by their respective counties including: the Kauaʻi County Department of Water, the City and County of Honolulu Board of Water Supply, the Maui County Department of Water Supply, and the Hawaiʻi County Department of Water Supply. On the island of Lānaʻi, the potable water supply system in the Mānele area is privately owned and operated by Lānaʻi Water Company, a subsidiary of Pūlama Lānaʻi. Each of the cable landing sites falls within the service area for the respective water system.

3.12.1.4 Wastewater

Each island is served by a variety of wastewater infrastructure including a centralized system with a network of pipelines, pump stations, and treatment facilities, as well as septic tanks and other decentralized systems. Wastewater infrastructure is present within or near the Project Area at each cable landing site. In particular, the Hawaiʻi Island cable landfall at PACRC is located immediately proximate to a wastewater pump station, which is owned and managed by the Hawaiʻi County Department of Environmental Management (DEM) Wastewater Division. Several underground pipelines extend from the pump station and traverse the Project Area with an outfall in Puhi Bay (Hawaiʻi County 2025).

3.12.1.5 Stormwater

The Project Area at each of the cable landing sites consists of a combination of undeveloped and paved surfaces, with stormwater flows directed toward natural drainage areas and/or developed stormwater conveyance infrastructure, including ditches, culverts, and pipelines. Most of the existing stormwater infrastructure is owned by the respective counties; however, HDOT and private entities also own and maintain certain infrastructure.

3.12.1.6 Solid Waste

The Kauaʻi DPW Solid Waste Division is responsible for solid waste management; the island's only landfill is located in Kekaha. The solid waste management facilities serving the Oʻahu cable landing site are the City and County of Honolulu ENV's Waimānalo Gulch landfill and the privately-owned PVT landfill, which receives construction and demolition waste. In Maui County, the solid waste disposal facilities serving the cable landing sites are owned and operated by the Maui County DEM Solid Waste Division and include the Central Maui Landfill, Molokai-Naiwa Landfill and Recycling Center, and Lānaʻi Landfill on Maui, Molokai, and Lānaʻi, respectively. The East Hawaiʻi Reload Facility, owned and operated by the Hawaiʻi County DEM Solid Waste Division, services the Hawaiʻi island cable landing site.

3.12.2 Potential Impacts and Mitigation Measures

3.12.2.1 Offshore Utility Infrastructure

The Project has been designed in a manner to avoid offshore utility infrastructure to the extent practicable. All known pipelines and outfalls have been avoided through Project siting and design. Where an existing subsea cable must be crossed, the crossing has been engineered to follow International Cable Protection Committee (ICPC) recommendations for geometry, separation, and protection; no additional protection is expected to be needed at any planned crossing location. BMPs that would be employed for cable crossings include the following:

- Crossing and/or proximity agreements would be executed with existing cable owners specifying alignment, protection type, minimum clearances, and notification requirements.
- The final design would incorporate near-right angle crossings where feasible and would maintain agreed-upon separation.
- The cable ship and support vessels would be equipped with dynamic positioning, lay-tension control, and marked exclusion zones to prevent contact with existing cables; no anchoring would occur within any crossing areas.
- A Local Notice to Mariners would be issued for the installation activities, with as-built coordinates provided to applicable cable owners and charting authorities. Records would be adequately maintained for future maintenance.

With implementation of these measures, construction-related impacts to existing telecommunications infrastructure would be negligible. Once constructed, the Project would provide critical middle mile infrastructure for the State of Hawaiʻi and is expected to substantially benefit

broadband connectivity by improving capacity and reliability for each of the main Hawaiian Islands. As it would provide more robust and diverse routes for data transmission, the system would work together with existing and future first mile as well as last mile infrastructure systems on each island to improve broadband access and availability for residents and businesses across the state.

3.12.2.2 Electricity and Telecommunications

Electricity requirements during construction would be provided via diesel generators as needed; operation of the Project would require minimal electricity to power the CLS facilities, which would be obtained through the existing electrical service provided to the respective UH-owned facilities. As such, construction of the Project would not substantially increase demands on the existing electrical grid on any of the islands.

Project construction would require excavation, trenching and other construction-related ground disturbance, some of which would be proximate to existing electrical utility infrastructure. The location of nearby infrastructure has been confirmed through surveys as well as coordination with the various utility companies, with design refinements as needed to maintain adequate separation. Detailed review of the design drawings will be coordinated with any potentially affected utility company as part of the permitting process, such that no conflicts or other impacts to existing electrical or telecommunications infrastructure is anticipated.

As described throughout Section 2, the Project would utilize fiber owned and operated by a licensed utility company as part of their existing utility network to provide a connection between the cable landfall and CLS facilities for each cable landing site. As the various utility companies maintain fiber on their system for purposes such as these, the Project would not unreasonably burden the telecommunications network or impact functionality on any of the islands. Rather, the Project would provide long-term benefits to the telecommunications network on each island by increasing the overall capacity and reliability of broadband available for use.

3.12.2.3 Water

Construction and operation of the Project is not expected to significantly affect water distribution infrastructure or supply at any of the cable landing sites. Project construction would require excavation, trenching and other construction-related ground disturbance, some of which would be proximate to existing water distribution infrastructure. The location of nearby infrastructure has been confirmed through surveys as well as coordination with the various utility companies, with design refinements as needed to maintain adequate separation. Detailed review of the design drawings will be coordinated with any potentially affected utility company as part of the permitting process, such that no conflicts or other impacts to existing water infrastructure is anticipated.

Water use would be required during construction primarily to support HDD drilling, as well as other construction activities (e.g., dust suppression, etc.). At each cable landing site, water is expected to be obtained via an existing fire hydrant, with temporary metering to track and account for usage. Preliminary discussions regarding water use have been held with the applicable system owner on each island; applications including final use calculations will be provided as part of the permitting process, with final approval obtained prior to construction. Once operational, the Project's only water

requirements would be for the HVAC system and fire suppression purposes at each of the new CLS facilities; these requirements would be met using the existing water system at each location. As overall water use would be kept to a minimum, with the majority of the water requirements occurring for only a short period of time during construction, and all water needs fulfilled through existing infrastructure, impacts would be less than significant.

3.12.2.4 Wastewater

The Project would not generate any sewage or sanitary wastewater. As operations would not require full-time on-site staff, no sanitary wastewater system would be needed. Portable sanitation units would be brought onsite during construction, as needed. Sanitation units would be regularly cleaned and emptied per manufacturer instructions. As such, the Project would not require a connection to or otherwise burden the municipal or other existing wastewater systems at any of the cable landing sites.

Project construction would require excavation, trenching and other construction-related ground disturbance, some of which would be proximate to existing wastewater infrastructure. The location of nearby infrastructure has been confirmed through surveys as well as coordination with the various utility companies, with design refinements as needed to maintain adequate separation. In particular, the Project has been specifically designed to avoid the wastewater pipelines that traverse the Project Area at PACRC. Detailed review of the design drawings will be coordinated with the Hawai‘i County DEM Wastewater Division as well as any potentially affected infrastructure system owners as part of the permitting process, such that no conflicts or other impacts to existing wastewater infrastructure is anticipated.

3.12.2.5 Stormwater

As noted for other utilities, the location of existing infrastructure has been confirmed through surveying as well as coordination with the various utility companies, and adequately avoided through the design process. Project construction would involve some temporary ground disturbance; however, as discussed in Section 3.4.2, BMPs would be implemented to avoid and minimize discharge of sediment and other pollutants via stormwater. Water used or generated during construction (e.g., dewatering effluent and equipment wash water) would be collected and managed onsite to prevent discharge to the stormwater system or nearby surface waters. If discharge is necessary, the contractor would obtain authorization under the applicable NPDES permit and implement BMPs consistent with the Project SWPPP, as well as any applicable county requirements. With implementation of these measures, construction-related impacts to stormwater infrastructure, if any, would be short-term and minor.

Following construction, the majority of the Project components would be located underground; contours and conditions would be restored to pre-existing conditions, such that the Project would not substantially alter drainage patterns. New impervious surfaces would generally be limited to the CLS facilities on Maui, Molokai, and Hawai‘i Island; these structures would be less than 1,000 square feet each and would not result in a notable increase in stormwater runoff, with sufficient areas for infiltration remaining in the immediate vicinity. As such, over the long term, it is expected that impacts to stormwater infrastructure would be negligible.

3.12.2.6 Solid Waste

Construction of the Project is not anticipated to generate a significant amount of solid waste. During construction, all waste would be temporarily stored onsite and periodically transported and properly disposed of in a permitted landfill, with green waste and recycling diverted to available facilities to the extent practicable. Once operational, the Project would generate little to no waste.

All solid waste generated during construction and operation of the Project would be disposed of in accordance with applicable regulations, and the amount of solid waste is not expected to unreasonably burden existing waste management services or facility capacity; as such, Project-related impacts to solid waste are expected to be short-term and minor.

3.13 Harbor Facilities and Marine Navigation

3.13.1 Affected Environment

3.13.1.1 Harbor Facilities

Harbor facilities in Hawai‘i are considered critical infrastructure, serving as important lifelines for the state’s economy and security, as well as recreational purposes. Given the need for the subsea fiber optic cable to interconnect with each island’s existing telecommunication network (along with other siting and routing criteria), many of the cable landfalls would be at or near a harbor facility, as these are typically located near the population centers of each island. Hawaii’s commercial harbors fall under the jurisdiction of HDOT Harbors Division, while recreational harbors are generally managed by DOBOR; in some cases, harbor facilities are collocated or are otherwise comanaged by HDOT and DOBOR. Table 3-16 summarizes the harbor facilities within or near the Project Area.

Table 3-16. Harbor Facilities Within or Near Project Area

Cable Landing Site	Harbor Facility	Jurisdiction	Project Components within Harbor Limits
Kaua‘i	None	N/A	N/A
O‘ahu	None	N/A	N/A
Maui	Kahului Harbor	HDOT	HDD conduit, BMH, and conduit for terrestrial cable located on undeveloped portion of western breakwater area; portion of subsea cable crosses under harbor channel (within HDD conduit)
Molokai	Kaunakakai Harbor	HDOT / DOBOR	Portion of subsea cable located along western margin of harbor basin
Lāna‘i	Mānele Small Boat Harbor	DOBOR	HDD conduit and BMH located within southern parking lot; conduit for terrestrial cable traverses under onshore portion of harbor facility
Hawai‘i Island	Hilo Harbor	HDOT	None

The USACE plays a central role in developing, improving, and maintaining harbor infrastructure across the U.S. Any such public infrastructure that the USACE helps to design, build, or maintain to support navigation (among other purposes) is considered a USACE Civil Works Project. To ensure that this infrastructure remains functional and safe, the USACE specifies that any activity that may modify a Civil Works Project requires prior authorization pursuant to 22 USC Section 408 (USACE 2018). Based on the USACE National Channel Framework, all of the harbor facilities listed in Table 3-16 include a

USACE Civil Works project, specifically related to harbor or channel dredging. These include the Kahului Deep Draft Harbor, Kaunakakai Harbor Basin, Mānele Small Boat Harbor Basin, and Hilo Deep Draft Harbor (USACE, 2025).

The Project was proactively sited to avoid all USACE Civil Works projects. In the case of Molokai, the cable was initially planned to be installed along the channel wall adjacent to the western edge of the Kaunakakai Harbor Basin. The basin, which was originally built in 1934, is approximately 1,500 feet long, 600 feet wide, and 23 feet deep; the USACE conducted maintenance dredging of the basin in 1973 and 2024 (USACE 2025a). Based on the marine dive surveys conducted for the Project (see Section 3.6.1.4), it was determined that much of the adjacent channel wall is colonized by coral, despite the highly disturbed and turbid environment. In an effort to minimize potential impacts to coral and based on preliminary discussions with USACE Section 408 staff, the cable route was relocated to the western edge of the harbor basin floor. As further discussed below, the cable would minimally encroach into the USACE-regulated harbor basin (see Figure 9.4).

3.13.1.2 Marine Navigational Routes and Vessel Traffic

The Project would traverse coastal and offshore waters near the main Hawaiian Islands, which support extensive marine vessel activity, including large commercial vessels, tug and barge operations, cruise ships, fishing fleets, military and other government vessels, commercial tour operators, and recreational boaters. It is critical that this complex marine traffic environment be considered in the siting and installation of subsea infrastructure, such as the HIFL system, to avoid navigational conflicts and ensure long-term protection of the cable from vessel-related risks. To this end, navigational routes and marine traffic were specifically accounted for during the cable routing and design process using Marine Cadastre Automatic Identification System (AIS) Vessel Transit data. Through this analysis, high-density vessel traffic zones were identified offshore of southern Oʻahu (i.e. proximate to Honolulu Harbor and Pearl Harbor) as well as near the harbor approaches on other islands, including Nawiliwili Harbor (Kauaʻi), Kahului Harbor (Maui) and Hilo Harbor (Hawaiʻi Island), where navigation corridors and anchorage zones concentrate maritime activity. The data also identified several other areas with slow-moving or drifting vessels in proximity to anchorages, indicative of anchoring or anchoring-related maneuvering.

Areas with high vessel activity could pose elevated risks due to potential interactions with the subsea cable, including cable entanglement and/or strikes resulting from emergency or routine anchor deployment. Areas of particular concern include channels associated with the islands' major freight ports, as tugboats towing multiple barges may drag long tow wires, chain bridles, or pendants near the seafloor—raising the possibility of equipment entangling the cable. These considerations were specifically addressed through the Project's siting and design process, with the cable routed around or under areas of high vessel activity and major shipping lanes. All of the cable segments have been routed around the harbor approach lanes, with the exception of the Segment 3 cable which must cross the main vessel approach to Kahului Harbor. In this case, HDD would be used to cross under the channel with the cable at a substantial depth beneath the seafloor. This approach minimizes the risk of anchor strike or entanglement and prevents interference with navigation, even in the event of

vessel mechanical failure or emergency anchoring. Through this process, the cable route has been sited to avoid areas with elevated risk of potential interactions with marine vessel traffic.

3.13.1.3 Aids to Navigation

Aids to Navigation (ATON) are physical and electronic markers that assist mariners with determining their position, avoiding hazards, and safely navigating waterways. ATON are typically operated and maintained by maritime authorities such as USCG and include features such as buoys, beacons, and lighthouses. Given the Project's location relative to several harbor facilities, there are a variety of ATON proximate to the proposed cable landfalls; these include channel markers associated with Kahului Harbor, range lights and channel markers associated with Kaunakakai Harbor, channel markers associated with Mānele Small Boat Harbor, and a range tower associated with Hilo Harbor.

The Project would not involve use of any ATON. Similar to marine navigational routes, ATON were considered as part of site selection and routing, and subsequently through the design refinement process. Through this process, the Project has been sited at a sufficient distance to avoid potential interference with the operation and maintenance of any nearby ATON; the only charted ATON that would fall within the Project Area are the range towers associated with Kaunakakai Harbor. As further discussed below, the Project has been designed in a manner to avoid any impacts to this feature.

3.13.2 Potential Impacts and Mitigation Measures

As listed in Table 3-16, the Maui, Molokai, and Lānaʻi cable landing sites would involve construction of Project infrastructure within either the onshore and/or offshore portions of existing harbor facilities. The Project has been sited and designed to avoid potential interference or disruption of harbor facilities and operations, as further described below for each site. Preliminary design drawings have been shared with HDOT and DOBOR, as appropriate for each site; ongoing coordination will occur as the design process progresses with agency approval of the final design drawings and construction plans obtained prior to initiating construction.

3.13.2.1 Kahului Harbor

In the case of Kahului Harbor, the Project components would be limited to the western breakwater area, which does not support any harbor infrastructure. As described in Section 2, the construction work area would be temporarily cordoned off, but these activities would not affect harbor operations or public access and use of harbor facilities. Once installed, all Project components within HDOT's property would be underground, and would not conflict with harbor infrastructure or otherwise affect operation or use of the harbor.

As described above, Segment 3 of the subsea cable (which would extend from Maui to Hawaiʻi Island) must traverse across the entrance channel to Kahului Harbor. To avoid any potential interference or conflicts with marine navigation, HDD would be used to install the cable under the channel at a substantial depth beneath the seafloor (Appendix C). Specifically, the cable would be more than 40 feet deep for approximately 750 linear feet where it crosses the entrance channel, transitioning to a depth of approximately 10 feet below the seabed before punching out at the eastern end of the vessel traffic boundary area. Articulated split pipe would be installed to provide additional cable protection

beyond this boundary. As the cable has been designed to avoid the harbor entrance channel and neither HDD nor cable laying activities would interfere with vessel traffic or ATON, no impacts to the harbor facility or marine navigation are anticipated.

3.13.2.2 Kaunakakai Harbor

The Molokai cable landfall was sited to avoid the wharf and onshore harbor facilities. As previously discussed, the subsea cable was initially planned to be installed along the channel wall adjacent to the western edge of the dredged harbor basin; however, dive surveys found this channel wall to be heavily colonized by corals, despite the high turbidity. In an effort to minimize coral impacts, the cable was rerouted along the western-most edge of the dredged harbor basin floor (see Figure 9.4). The cable would be hand-placed by divers and would be tucked up against the base of the channel wall, in a manner that seeks to avoid corals while also limiting encroachment into the basin. Given the need to balance impacts to both corals as well as the federal harbor project, it is anticipated that the cable would minimally encroach into the limits of the dredged harbor basin, thus requiring USACE Section 408 approval.

As the cable would be located along the western-most edge of the harbor basin floor, well away from the portions of the basin used for vessel movement and anchoring, it is not expected to create navigation risks or impede routine use of the harbor basin. Articulated split pipe would be installed around the cable to provide additional cable protection; it is expected that in areas with soft substrate, the cable would rapidly self-bury, further reducing any potential cable interactions. As the harbor basin was recently dredged (2024), more than fifty years since the last dredging, it is anticipated that any future dredging would occur well beyond the design life of the cable system. In addition to coordinating the final design drawings with HDOT, Section 408 approval from the USACE would also be obtained. As the cable would not be expected to materially affect use and operation of the harbor basin and all necessary agency approvals would be obtained prior to construction, no adverse impacts are anticipated.

Range lights, which are ATON associated with Kaunakakai Harbor, are located on the Molokai Yacht Club property, and as such, are within the Project Area. However, the Project has been designed in a manner such that neither construction nor operation would obstruct or otherwise affect the range lights. While the construction work area for the cable landfall would fall between the range towers, all work would be set back a minimum of 10 feet from the range towers and the maximum height of the construction equipment would fall well below the range tower lights (30 feet and 43 feet amsl). Once installed, all Project components would be belowground and would have no effect on operation or use of the range lights.

3.13.2.3 Mānele Small Boat Harbor

The Project components required for the Lānaʻi cable landfall would be located within and traverse actively used portions of the onshore facilities associated with Mānele Small Boat Harbor. Through coordination with DOBOR, the Project components have been sited and would be installed in a manner that minimizes potential conflicts to onshore harbor facilities to the extent possible. During construction, a portion of the southern-most parking lot would be cordoned off to ensure public

safety. While this would temporarily reduce available boat parking and would require traffic controls, it would not obstruct access or restrict use of any harbor facilities, including the nearby boat ramp. The terrestrial cable would traverse the harbor property; however, HDD would be used to install underground conduit for the terrestrial cable, thus minimizing overall disturbance of the harbor property. With use of HDD, ground disturbance within the harbor property would be limited to the area around the BMH (including HDD drilling operations) and limited trenching to interconnect either end of the terrestrial conduit. While construction activities would generate noise and result in limited use of the southern-most parking lot, these activities would not significantly affect overall harbor operations such that impacts would be temporary and minor. Once installed, all Project components would be located entirely underground and would have no effect on either harbor operations or public access and use of the harbor facilities.

3.13.2.4 Marine Navigational Routes and Vessel Traffic

The Project is not expected to interfere with marine navigation or vessel operations. No surface buoys or above-water infrastructure is proposed. The subsea cable would be installed along an engineered route, designed to conform and lay flush with the seabed. As described above, the subsea cable route was specifically routed around shipping lanes, navigational channels, designated anchorage zones, and high-density vessel transit areas to the extent practicable. While one segment of the cable must traverse the approach channel to Kahului Harbor, in this case, the cable would cross under the channel in HDD conduit deep beneath the seafloor (see Appendix C). In other shallow or high-risk areas, the cable would be protected using articulated split pipe or similar means. For these reasons, the Project is not expected to adversely affect marine navigation or vessel operations.

During construction, the presence of the cable ship and support vessels could result in temporary and localized disruptions to marine vessel traffic. Potential impacts would be avoided and minimized through standard marine coordination and notification protocols, including those listed below.

- Prior to and following installation of the cable system, a comprehensive Marine Liaison and Cable Awareness Program would be implemented. Activities included in this program would include (but would not be limited to) community outreach and education efforts, coordination with harbor masters and seabed users, and providing the cable as-laid position data to appropriate parties. Website and 24-hour contact information would specifically be provided via the community outreach meeting and annual visits to each port/harbor master as well as each cable landing site.
- The cable installation schedule would be coordinated in advance with the USCG and local harbor authorities.
- A Local Notice to Mariners would be issued prior to construction to alert other vessels of the presence of Project vessels, duration of activities, requested separation distance, and relevant contact information, pursuant to USCG requirements.
- Project vessels would comply with all standard maritime safety protocols, including signaling and coordination.

With implementation of these measures, it is expected that any impacts to marine navigation and vessel traffic during construction would be temporary and minor.

3.14 Traffic and Transportation

3.14.1 Affected Environment

3.14.1.1 Kauaʻi Cable Landing Site

The cable landfall on Kauaʻi is located within Nukoliʻi Beach Park. The BMH would be sited in an undeveloped portion of the beach park from which the terrestrial cable would be installed in underground conduit along the edge of Kauaʻi Beach Road and Kauaʻi Beach Drive until reaching Kūhiō Highway (Highway 56). From this point, the Project would utilize fiber on the existing utility network until reaching the CLS location within the KCC campus. KCC is located along Kaumualiʻi Highway (Highway 50).

Kauaʻi Beach Road and Kauaʻi Beach Drive are two-lane roads that provide local access to the Outrigger Kauaʻi Beach Resort & Spa and Nukoliʻi Beach Park from Kūhiō Highway. Kūhiō Highway, which is owned by HDOT, is the major thoroughfare for eastern and northern Kauaʻi, generally running along the coastline between Hanalei and Līhuʻe. It is a two-lane highway that widens to three lanes at various points and up to four lanes upon approaching Līhuʻe; at its intersection with Kauaʻi Beach Drive, there are two north-bound lanes and one south-bound lane, as well as dedicated turning lanes. The average annual daily traffic (AADT) for the stretch of highway nearest to the cable landfall is 32,771 (HDOT 2023). Kaumualiʻi Highway, also owned by HDOT, extends from junction with Kūhiō Highway in Līhuʻe to the west side of Kauaʻi. Near KCC, Kaumualiʻi Highway is a four-lane highway with dedicated turning lanes; the AADT is 27,100 (HDOT 2023). Kaumualiʻi Highway includes pedestrian sidewalks and a bike lane near KCC. Neither pedestrian sidewalks nor bike lanes exist along other roadways proximate to the Project Area.

3.14.1.2 Oʻahu Cable Landing Site

The Oʻahu cable landfall is at Barbers Point Beach Park, which is located off a cul-de-sac at the end of ʻŌlaʻi Street. ʻŌlaʻi Street is a county-owned roadway and is part of the local roadway network within Campbell Industrial Park; regional access to this area is via Interstate H-1 and Farrington Highway (Route 93). Near the Project Area at Barbers Point Beach Park, ʻŌlaʻi Street is a two-lane undivided road; no pedestrian sidewalks or bike lanes are present in this area.

3.14.1.3 Maui Cable Landing Site

The cable landfall on Maui is located on the western breakwater area of Kahului Harbor. From the BMH, terrestrial cable would be installed in underground conduit extending across the breakwater area and under Kahului Beach Road (Route 3400) to a manhole sited next to an existing utility pole with the Kahului Beach Road ROW. From this point, the Project would utilize fiber on the existing utility network until reaching the CLS within the UH Maui College campus. Wahinepio Avenue runs along the northwestern edge of the campus; a driveway extending from Wahinepio Avenue would be used to access the CLS.

Kahului Beach Road, which is under the jurisdiction of HDOT Highways Division, is a four-lane divided roadway that links Kahului and Wailuku; the AADT for the stretch of Kahului Beach Road near the Project Area is 29,300 (HDOT 2023). A two-lane unnamed roadway extending from Kahului Beach Road (with designated turning lanes) provides access to the harbor breakwater area; overflow parking, temporary access points into the breakwater area, as well as a bike lane are located further west along the makai side of Kahului Beach Road. Within the harbor breakwater is a large undeveloped parking lot, which is used for boat/trailer parking associated with the nearby boat ramp and other harbor uses.

Wahinepio Avenue is a county-owned roadway which runs between Kahului Beach Road and West Kaʻahumanu Avenue. In the vicinity of the proposed CLS, Wahinepio Avenue is a two-lane road with a driveway extending into the UH Maui College campus; a pedestrian sidewalk is present on the opposite side of the roadway.

3.14.1.4 Molokai Cable Landing Site

The cable landfall on Molokai is located adjacent to Kaunakakai Harbor on the property used for the Molokai Yacht Club. Access to this site from Maunaloa Highway is via Kaunakakai Place and Hio Place. The CLS would be located at the Molokai Education Center, which is located at the intersection of Maunaloa Highway and Alanui Kaimike Street; access to the property is via a driveway off Alanui Kaimike Street. Between the cable landfall and CLS, the Project would utilize fiber on the existing overhead utility network which extends along Maunaloa / Kamehameha V Highway and existing underground conduit extending into the Molokai Education Center.

Maunaloa Highway (Highway 460) is a two-lane undivided highway that provides regional access from Maunaloa to the east side of Molokai. This roadway falls under the jurisdiction of HDOT Highways Division; the AADT for the stretch of Maunaloa Highway nearest to the cable landfall is 5,600 (HDOT 2023). Kaunakakai Place, which extends from Maunaloa Highway and provides access to Kaunakakai Harbor, is also under HDOT jurisdiction. Hio Place and Alanui Kaimike Street, both of which are county-owned roadways, provide localized access to the Molokai Yacht Club and Molokai Education Center properties, respectively. A short segment of pedestrian sidewalk fronts the Molokai Education Center property along Alanui Kaimike Street; no other sidewalks or bike paths are present within or proximate to the Project Area.

3.14.1.5 Lānaʻi Cable Landing Site

The cable landfall on Lānaʻi is located at the Mānele Small Boat Harbor on the south side of the island. Access to the boat harbor is via Mānele Road, a two-lane undivided highway that provide regional access from Lānaʻi City. Mānele Road falls under the jurisdiction of HDOT Highways Division; the AADT for the stretch of Mānele Road nearest to the cable landfall is 630 (HDOT 2023). The entrance road to the harbor is a two-lane undivided road providing localized access from Mānele Road. Within the harbor facility, there are a series of access roads linking the harbor facilities and associated parking lots. The BMH would be located along the edge of the southern-most parking lot, which is located nearest the boat ramp and is used by harbor patrons for boat/trailer parking.

3.14.1.6 Hawai‘i Island Cable Landing Site

The cable landfall on Hawai‘i Island is at the PACRC, located just east of the Hilo Harbor breakwater and accessed via a driveway off Kalaniana‘ole Street. The CLS would be located on the northern side of the UH Hilo campus; access to this site is via Kapi‘olani Street. Between the cable landfall and CLS, the Project would utilize fiber on the existing overhead utility network which extends along a series of state and county-owned roadways.

Kalaniana‘ole Road (Route 137), which falls under the jurisdiction of HDOT Highways Division, is the primary access route along Hilo’s northern coast; the AADT for the stretch of Kalaniana‘ole Road nearest to the cable landfall is 10,118 (HDOT 2023). Access into PACRC is a driveway entrance opposite Pua Avenue; a pedestrian sidewalk is located along a portion of Kalaniana‘ole Road opposite PACRC.

Kapi‘olani Street, which extends from West Lanikāula Street, is a two-lane road that extends along the east side of the UH Hilo campus. From Kapi‘olani Street, access into the campus is via a two-lane unnamed access road, which connects with a series of internal campus roadways and parking lots. A pedestrian sidewalk fronts the UH Hilo campus along Kapi‘olani Street.

3.14.2 Potential Impacts and Mitigation Measures

The equipment to be used for construction of the terrestrial components at each cable landing site would be transported to the respective commercial harbor on each island via a freight shipping company and offloaded to standard transportation trucks. The trucks would deliver and offload the equipment to the Project site via existing state and county roadways. It is anticipated that a total of approximately 15-25 truck trips would be required to transport the construction equipment to the Project site on each island, including 2-3 oversized loads (for the HDD drill rig and modular CLS structure, as applicable). These trips would be staggered over multiple days and would occur at off-peak hours; flaggers and/or an escort would be used for the oversized loads as needed. In addition to movement of construction vehicles and equipment, an average of 2-4 trips per day are anticipated for construction workers accessing each cable landing site. Given the relatively limited number of vehicles that would travel to each cable landing site on a daily basis, construction of the Project is not expected to significantly contribute to average daily traffic volumes.

In addition to a minimal increase in vehicle volumes, installation of underground conduit for the terrestrial fiber optic cable would also require work within or near roadways at some cable landing sites, which would result in short-term traffic impacts. While the Project has been designed to minimize work within travel ways to the extent practicable, some temporary traffic and/or parking restrictions would be required in certain locations to ensure construction safety. Temporary traffic and/or parking restrictions are expected to include those listed below; on average, each of these restrictions would be expected to occur over an approximately 4 to 6 week period (or less, in some cases).

- **Kaua‘i Cable Landing Site:** Partial lane closures would be required along Kaua‘i Beach Road and Kaua‘i Beach Drive to accommodate installation of underground conduit along the makai roadway shoulder. In addition, temporary closure of the outermost northbound lane and turning lane on Kūhiō Highway would be required to accommodate interconnection of the underground conduit with the existing utility system.

- **Oʻahu Cable Landing Site:** Partial closure of the parking lot at Barbers Point Beach Park would be required to accommodate installation of underground conduit.
- **Maui Cable Landing Site:** Construction access to the western harbor breakwater area would be via a temporary construction access road and would not affect the primary access road; no lane closures are anticipated. Partial lane closure or lane shifting would be required along the mauka side of Kahului Beach Road to accommodate interconnection of the underground conduit with the existing utility system. Partial lane closure of the entry driveway to the CLS location at UH Maui College would also be required to facilitate underground conduit installation.
- **Molokai Cable Landing Site:** No lane closures are expected to be required.
- **Lānaʻi Cable Landing Site:** Partial closure of the southern-most harbor parking lot would be required to accommodate construction activities; traffic controls would be used to maintain access to the boat ramp. Partial lane closure would also be required along portions of Mānele Harbor Road to accommodate installation of underground conduit.
- **Hawaiʻi Island Cable Landing Site:** Access to and within the campus parking lots adjacent to the CLS location may be restricted during certain times within the construction period (e.g., for staging or movement of equipment).

While these partial lane closures and parking restrictions could temporarily increase traffic, vehicular access would be maintained to all harbor facilities, beach parks, and other publicly accessible locations. Similarly, no pedestrian sidewalks or bike lanes would be affected by any temporary lane closures. Prior to construction, detailed construction drawings would be submitted for review and the necessary permits for work within state and county roadways would be obtained from HDOT and the applicable county agencies, respectively. Through this process, site-specific traffic control plans would be developed and approval obtained from the appropriate agencies. These plans would detail the specific measures that would be implemented to minimize potential traffic impacts; these measures are expected to include providing advance notifications to the appropriate agencies and community, maintaining appropriate signage, and providing traffic controls (e.g., flaggers, etc.). As the construction-related traffic and parking restrictions would be temporary, with potential impacts minimized through implementation of approved traffic control plans, it is expected that construction-related effects on traffic would be short-term and minor.

Once Project components have been installed, all affected roadways would be restored to their pre-existing conditions (or better). Project operations would not require any vehicular use, with the exception of occasional monitoring and maintenance activities. As such, no long-term impacts on traffic or public roadways would occur.

3.15 Public Facilities and Services

3.15.1 Affected Environment

3.15.1.1 Kaua‘i Cable Landing Site

Police and fire services on the island of Kaua‘i are provided by Kaua‘i Police Department and the Kaua‘i Fire Department, respectively. The closest police station to the Project Area is in Līhu‘e, approximately 2.3 miles southwest of Nukoli‘i Beach Park and 2.7 miles east of the CLS at KCC. The closest fire station is the Līhu‘e Fire Station, located approximately 3.0 miles southwest of Nukoli‘i Beach Park and 2.0 miles east of the CLS.

Emergency medical services on Kaua‘i include six ambulance units, provided by American Medical Response. The closest hospital to the Project Area is the Wilcox Medical Center, located on Kūhiō Highway approximately 2.3 miles southwest of Nukoli‘i Beach Park and 2.3 miles northeast of KCC.

3.15.1.2 O‘ahu Cable Landing Site

Police and fire services on O‘ahu are provided by the City and County of Honolulu Police and Fire Departments (respectively). The Barbers Point cable landfall is within the area served by the Kapolei District Police Station, which is approximately 3.2 miles northeast of Barbers Point Beach Park, and the Kalihi District Police Station, which is approximately 3.1 miles northeast of the CLS. The closest fire stations to the Project Area are the Kapolei Fire Station, located on Lauwiliwili Street approximately 2.1 miles northeast of Barbers Point Beach Park, and the Moanalua Fire Station, located on Ala Ilima Street approximately 1.3 miles northeast of the CLS.

Emergency medical services are provided by the City and County of Honolulu Emergency Medical Services Department, which includes 23 ambulances covering four districts. The nearest unit to the cable landing site is stationed at Kapolei Fire Station (Honolulu Emergency Services Department 2025). The nearest hospital to the cable landing site is Queen’s Medical Center-West O‘ahu, located on Fort Weaver Road approximately 3.5 miles northeast of Barbers Point Beach Park. Kaiser Moanalua Medical Center is located on Moanalua Road approximately 2.3 miles northeast of the CLS.

3.15.1.3 Maui Cable Landing Site

Police and fire services on Maui are provided by Maui County Police and Fire Departments (respectively). The closest police station to the Project Area is located on Mahalani Street, approximately 0.5 miles southwest of the CLS at UH Maui College. The closest fire station is the Wailuku Fire Station located on Kinipopo Street, approximately 1.2 miles west of the CLS.

Emergency medical services on Maui are provided by American Medical Response, including ambulances based in both Kahului and Wailuku. The closest hospital to the Project Area is Maui Memorial Medical Center, which is located on Mahalani Street, approximately 0.7 miles southwest of the CLS at UH Maui College.

3.15.1.4 Molokai Cable Landing Site

Police and fire services on Molokai are provided by Maui County Police and Fire Departments (respectively). The closest police station to the Project Area is the Molokai Police Station located on Ainoa Street in Kaunakakai, approximately 0.5 miles northeast of the cable landfall at the Molokai Yacht Club. The closest fire station is the Kaunakakai Fire Station located on Kakalahale Street, approximately 0.9 miles northeast of cable landfall at Molokai Yacht Club and 0.2 miles northeast of the CLS at Molokai Education Center.

Emergency medical services on Molokai are provided by American Medical Response, including two ambulance units on the island. The closest hospital to the Project is Molokai General Hospital, located on Home Olu Place in Kaunakakai, approximately 0.6 miles northeast of the cable landfall at Molokai Yacht Club and 0.3 miles northwest of Molokai Education Center.

3.15.1.5 Lānaʻi Cable Landing Site

Police and fire services on Lānaʻi are provided by Maui County Police and Fire Departments (respectively). The closest police station to the Project Area is the Lānaʻi Police Station located at on Fraser Avenue in Lānaʻi City, approximately 6 miles north of the cable landfall at Mānele Harbor. The closest fire station is the Lānaʻi Fire Station, also located on Fraser Avenue. These facilities are both within 0.5 mile of the Lānaʻi Education Center.

Emergency medical services on Lānaʻi are provided by American Medical Response. The closest hospital to the Project is Lānaʻi Community Hospital, located on 7th Street in Lānaʻi City, approximately 8.1 miles north of the cable landfall at Mānele Harbor and within 0.1 mile of the CLS.

3.15.1.6 Hawaiʻi Island Cable Landing Site

Police services on Hawaiʻi Island are provided by the Hawaiʻi County Police Department. The closest police station to the Project Area is the Hilo Police Station, which is located approximately 2.6 miles southwest of the cable landall at PACRC and 0.9 miles north of the CLS at UH Hilo. The Hawaiʻi Fire Department is primarily responsible for fire protection and suppression and pre-hospital emergency medical services for the County of Hawaiʻi. The closest fire stations to the Project Area are the Waiakea Fire Station (located approximately 0.8 miles southwest of the cable landfall at PACRC) and the Central Hilo Fire Station (located approximately 1.2 miles north of the CLS at UH Hilo).

Emergency medical services on Hawaiʻi Island are provided by American Medical Response, including a total of 15 ambulance units. The closest hospital to the Project Area is Hilo Benioff Medical Center, located on Waianuenue Avenue, approximately 4.3 miles southwest of the cable landfall at PACRC and 2.3 miles northwest of the CLS at UH Hilo. The Hilo Medical Center Emergency Room is located at the same address.

3.15.2 Potential Impacts and Mitigation Measures

The Project is not expected to present any security concerns or otherwise result in an increased demand for police protection, either during construction or operation. During construction, the Project Area would be staffed with security personnel on an as-needed basis to protect equipment

and machinery used to construct the Project. Once operational, the facilities would be adequately secured and are not expected to require additional security on a regular basis. Comment letters received from the Maui Police Department and County of Hawai‘i Police Department in response to the pre-assessment scoping letter did not identify any significant concerns with respect to public safety or police services. As such, the Project is not expected to impact police services at any of the cable landing sites.

Construction of the Project facilities has the potential to increase the risk of fire due to errant sparks from construction vehicles and equipment, as well as increased human presence (e.g., improperly discarded matches and cigarette butts). However, these ignition sources typically have limited intensity and under most conditions would be unlikely to cause a fire. Furthermore, basic onsite fire-fighting equipment (e.g., fire extinguishers) would be maintained in construction vehicles and staging areas at each cable landing site as appropriate. During operations, certain Project components could increase the risk of fire, primarily those associated with the CLS (e.g., electronic equipment). To minimize fire hazards, each CLS would be equipped with an automatic fire detection and suppression system, including smoke detectors and automated fire extinguishing systems. For these reasons, the Project is not expected to impact fire protection services at any of the cable landing sites.

Construction and operation of the Project would not place substantial additional demands or otherwise impact existing emergency services or hospital facilities. Each cable landing site is in an area served by emergency medical services and a hospital facility. Implementation of a Site Safety Plan and observance of safe working practices during construction are expected to substantially reduce the potential for serious accidents that could place an undue burden on local emergency services and hospital facilities. Should an incident occur during construction of the Project, standard procedures would be employed to request emergency medical services. With implementation of these measures and observance of safe working practices during construction and operation, impacts to public services and facilities from construction and operation of the Project would be negligible.

3.16 Recreational Resources

3.16.1 Affected Environment

3.16.1.1 Kaua‘i Cable Landing Site

The cable landfall on Kaua‘i would be within an undeveloped portion of Nukoli‘i Beach Park, which is privately owned but utilized by the public. Facilities at the beach park include restrooms, parking area, and picnic tables. The shoreline area is generally used for beachgoing and fishing; the nearshore waters are rocky and not well suited for swimming but could be used for snorkeling and scuba diving when waters are calm. The privately-owned Outrigger Kaua‘i Beach Resort is approximately 0.2 miles north of the cable landfall and adjacent to the underground conduit for terrestrial cable along Kaua‘i Beach Road/Drive. Other recreational facilities within a mile of the cable landfall include: Wailua Golf Course and Kālepa Mountain Forest Reserve to the north (beyond Outrigger Kaua‘i Beach Resort) and Ahukini Recreation Pier State Park and Hanamā‘ulu Beach Park to the south.

Recreational facilities within a mile of the CLS at KCC include: Kilohana Estate, a privately owned retail and performance space to the east, and Kauaʻi Community Market, Puhi Park, Hokulei Park, and Puakea Golf Course to the south.

3.16.1.2 Oʻahu Cable Landing Site

The cable landfall on Oʻahu would be within an undeveloped portion of Barbers Point Beach Park, which is publicly owned and managed by the City and County of Honolulu DPR. Facilities at the beach park include restrooms, parking area, and picnic tables. The shoreline area is generally used for beachgoing and fishing; the nearshore waters are rocky and not well suited for swimming.

Germaine's Luau, a privately owned performance space, abuts the western boundary of the beach park, approximately 500 feet west of the BMH locations. The historic Barbers Point Lighthouse is located just beyond Germaine's Luau, approximately 0.1 mile west of the BMH locations. Other recreational facilities within one mile of the cable landfall include Kalaeloa Beach to the west.

3.16.1.3 Maui Cable Landing Site

The cable landfall on Maui would be located on the western breakwater area of Kahului Harbor. The western breakwater area is largely undeveloped, with recreational facilities in the southern portion; these include an unpaved parking area, boat ramp, picnic tables, and the Hale Kiawe Senior Fishing Club clubhouse. Kahului Harbor accommodates various commercial and recreational marine activities and is the port through which most cruise ship visitors reach Maui (County of Maui 2012). Shoreline areas and nearshore waters are used for boating and fishing.

The harbor breakwater is bounded to the southwest by Kahului Beach Road, beyond which is the County of Maui's Keōpūolani Regional Park and Maui Arts & Cultural Center. The proposed CLS location at UH Maui College is also adjacent to the southern edge of Keōpūolani Regional Park and Maui Arts & Cultural Center, separated by Wahinepio Avenue. Keōpūolani Regional Park is the County of Maui's largest park, comprising approximately 110 acres; it includes a variety of sports fields, a track, amphitheater, gymnasium, pool, picnic areas, and restrooms (County of Maui 2025a). Maui Arts & Cultural Center is a multi-disciplinary arts facility and gathering place. The Maui Swap meet is held on Saturdays in the parking area on the northern edge of the UH Maui College campus.

Other recreational facilities within a mile of the Project Area include Veteran's Peace Park, Paukūkalo Beach Park, and Pāpōhaku Park to the north; Maui Family YMCA, Maui Nui Botanical Gardens, Boys and Girls Club, Keopuolani Skateboard Park, and various sports facilities of Baldwin High School to the west; and Kahului Community Center Park and Kahului Community Center to the south.

3.16.1.4 Molokai Cable Landing Site

The cable landfall on Molokai would be located adjacent to Kaunakakai Harbor on the property used for the Molokai Yacht Club. The Molokai Yacht Club is a privately owned boat club; facilities include a clubhouse and unpaved parking area. The clubhouse is occasionally used by the Coast Guard Auxiliary and Molokai community for meetings and events. Race organizers for a Maui to Molokai outrigger

canoe race, known as the Pailolo Challenge, also use the facilities for their 2-day event, typically held in September (Molokai Yacht Club 2023).

Just east of the Molokai Yacht Club is Malama Cultural Park, which is designated as a Special District by DHHL and managed under a Special Area Plan (DHHL 2025; DHHL 2022). Molokai Canoe Club and the Waʻakapaemua Canoe Club are also both based in this area. Beyond Malama Cultural Park, approximately 0.1 mile east of the cable landfall is Kaunakakai Wharf, surrounded by Kaunakakai Harbor. The harbor is used for recreation, as well as cargo and commercial uses; facilities include two docks, 29 berths/moorings, a pier, vessel washdown, and restrooms. Commercial operations are overseen by HDOT Harbors Division and recreational uses are managed by DOBOR. The harbor is a popular area for surfing and outrigger canoe racing during the summer months (Moon 2025, Visit Molokai 2024). The shoreline areas and nearshore waters are also used for boating, fishing, beachgoing, and swimming.

Recreational facilities adjacent to the proposed CLS location at the Molokai Education Center include Duke Maliu Regional Park, an approximately 10-acre park with sports fields, a concession pavilion, picnic areas, and restrooms. Other recreational facilities within a mile of the Project Area include the Cooke Memorial Pool, Mitchell Pauole Community Center, and Kaunakakai Ball Park to the north and Kalokoʻeli Fishpond to the east.

3.16.1.5 Lānaʻi Cable Landing Site

The cable landfall on Lānaʻi would be located at Mānele Harbor, which is managed by DOBOR and is the island's only publicly accessible small boat harbor. Harbor facilities include a pier, boat ramp, berths for both private vessels and tour boats, loading dock, vehicle and boat parking areas, restrooms, and showers. The harbor grounds also include a small general store, covered pavilion, and outdoor seating. In addition to use by local residents, the harbor also accommodates cruise boats, commercial tour boats, and the Maui-Lānaʻi Ferry (Hawaiʻi Harbors 2025). Shoreline areas and nearshore waters fronting Mānele Harbor are used for boating and fishing.

Hulopoʻe Beach Park, which is located on Hulopoʻe Bay, is approximately 0.3 miles southwest of the cable landfall. The privately-operated beach park includes picnic tables, barbeque grills, restrooms and showers, as well as the island's only beachfront campground (Pūlama Lānaʻi 2019). On the west shore of Hulopoʻe Bay is the privately owned Four Seasons Resort Lānaʻi and Mānele Golf Course. The shoreline area and nearshore waters of Hulopoʻe Bay are used for beachgoing, swimming, snorkeling, kayaking, and bodyboarding; several tide pools are also located along the shoreline. Hulopoe-Huawai Fishing Trail runs approximately 1.75 miles along the shoreline, just makai of the resort and is commonly used for hiking and access to fishing spots along the coastline (DOFAW 2025a). Further south beyond Hulopoʻe Beach Park is the Puʻu Pehe Islet Heritage Trail and Puʻu Pehe Islet lookout. Puʻu Pehe Islet, also known as Sweetheart Rock, is a tall basalt sea stack located between Mānele Harbor and Hulopoʻe Bay just offshore from the main island of Lānaʻi. The islet is a seabird sanctuary and is closed to the public (DOFAW 2025b).

3.16.1.6 Hawai‘i Island Cable Landing Site

The cable landfall on Hawai‘i Island is located at the PACRC just east of the Hilo Harbor breakwater. Keaukaha Beach Park, which is situated on lands owned by DHHL, is located to the east (just beyond the county wastewater pump station) and extends along the shoreline fronting the PACRC facility; the HDD borehole would extend under approximately 75 linear feet of this property. The beach park includes picnic tables and barbeque grills, showers, and portable restrooms. Shoreline areas and nearshore waters in the vicinity of the Project Area are used for picnicking, swimming, snorkeling, tidepooling, and fishing.

Other recreational facilities within a mile of the cable landfall include: Kūhiō Kalaniana‘ole Park, Reed’s Bay Beach Park, Reed’s Bay Anchorage, and Hilo Bay to the west, Hualani Park to the south, and Chock’s surf break and Onekahakaha Beach Park to the east.

The CLS is located at the UH Hilo campus, which includes several recreational and sports complexes. Within one mile of the CLS is University Heights Park and Wailoa River State Recreation Area to the north and Lokahi Park to the southeast.

3.16.1.7 Offshore Marine Waters

As shown in Figure 1, the subsea cable would extend through state and federal waters between the six main Hawaiian Islands. These offshore waters, which include deeper and more open ocean environment beyond the immediate coastal areas, support marine-based recreational activities such as scuba diving, surfing at offshore breaks, sportfishing, and boating or sailing. Whale watching vessels operate in both nearshore and offshore waters during the humpback whale migration season, particularly in the Au‘au Channel (between Maui, Molokai, Kaho‘olawe, and Lāna‘i), which is part of the Hawaiian Islands Humpback Whale National Marine Sanctuary (NOAA Fisheries 2025). Annual inter-island canoe races also take place in offshore waters between the islands. Notable racing events that cross the subsea cable route include the Maui to Molokai (M2M), Molokai Holokai Ho‘olaule‘a, and Pailolo Challenge (Maui Paddling Hui 2025, Race Roster 2025, Pailolo Challenge 2025).[24]

3.16.2 Potential Impacts and Mitigation Measures

Construction of the onshore Project components (e.g., HDD borehole, BMH, and buried terrestrial cable) would require temporary use of and ground disturbance within recreational areas at five of the six cable landfalls. This would include undeveloped portions of Nukoli‘i Beach Park (Kaua‘i), Barbers Point Beach Park (O‘ahu), Kahului Harbor western breakwater area (Maui), Molokai Yacht Club (Molokai), and a portion of the southern-most parking lot at Mānele Small Boat Harbor (Lāna‘i). None of the other onshore facilities, including the CLS structures, would disturb areas used for recreation.

Construction at each of the cable landfalls is expected to require temporary use of approximately 0.5-1.0 acre for equipment staging and construction activities. This would generally comprise the area surrounding the proposed BMH location, located entirely within the Project Area (see Figures 3.1 through 3.6); use of these areas would be temporary, with an expected duration of no more than

[24] The race routes for the Na Wahine O Ke Kai and Molokai Hoe cover approximately 41 miles across the Ka‘iwi Channel from Molokai to O‘ahu, outside of the proposed subsea cable route.

approximately 12 weeks (depending on the site). During this time, the Project would not restrict or otherwise limit access to or use of recreational facilities at any of the sites. The area to be used for construction would be cordoned off for public safety purposes; however, each site has ample space available and temporary construction use is not expected to restrict or substantially limit recreational opportunities for the public.

Ground disturbance and use of heavy equipment associated with construction could result in temporary indirect impacts associated with increased dust and noise, for both onsite and nearby recreational activities. In addition, construction activities could also cause temporary traffic and congestion for recreationalists due to an increased number of onsite vehicles and/or activities in areas used for access and parking (in particular, trenching for the terrestrial cable within the access roadway to Nukoliʻi Beach Park [Kauaʻi], the driveway and parking lot within Barbers Point Beach Park [Oʻahu], and the southern-most parking lot for Mānele Small Boat Harbor [Lānaʻi]). However, as described throughout this document, BMPs would be implemented to avoid and minimize these impacts to the extent practicable (see Sections 3.10, 3.11, and 3.15, respectively). Furthermore, advance notice of the work would be properly communicated to the community and coordinated with the managing entity for the recreational facilities at each site to minimize potential conflicts with any scheduled or anticipated events.

Temporary impacts to recreationalists using offshore and nearshore waters may also occur during HDD drilling and subsea cable laying activities. Ocean waters would remain open to activities such as boating, surfing, diving, and swimming throughout Project construction, with monitoring and buffer zones around active work areas to maintain public safety. During the HDD drilling activities, the immediate area around the punchout point in nearshore waters would be monitored by a dive boat; this work would generally occur over a one-day period. During the shore end landings and the main cable lay, a 300-foot buffer zone would be maintained around the cable ship and support vessels; this work would occur over a one-day period for each cable landfall and over approximately 50-60 days for the entire statewide cable route. As the marine-based construction activities would be very short in duration at any given site (i.e. approximately one day) and the affected areas would be extremely limited compared to the expansive nearshore and offshore waters, construction-related impacts would be short-term and minor. Advanced notice of the work would also be properly communicated to the public and coordinated with any relevant organizations to minimize potential conflicts with scheduled marine-based events. Furthermore, a Local Notice to Mariners would be issued through USCG and other appropriate channels in the weeks prior to commencement of cable-laying activities to alert other vessels of the cable ship's presence, expected time in the area, and relevant contact information.

Once constructed, all Project components located within recreational areas would be located at or below ground and there would be no further disruption to any nearshore or offshore recreational resources. As such, Project operations would not result in any long-term direct or indirect impacts to recreational resources and uses.

3.17 Scenic and Visual Resources

Visual resources include both the natural and constructed elements of the landscape that enhance the public's enjoyment and appreciation of the environment. Visual or scenic impacts are assessed based on a project's physical features, visibility, and how it might alter the visual character and scenic quality of its surroundings, particularly any scenic vistas and view planes identified in relevant county general and community plans. As further discussed in Section 5, each of the cable landing sites would be located either partially or entirely within the SMA; regulation of development within the SMA specifically considers potential impacts to public views toward and along the shoreline.

3.17.1 Affected Environment

3.17.1.1 Kauaʻi Cable Landing Site

The Kauaʻi cable landing site is located on the island's southeastern coast, which consists of gently sloping land that transitions from the mountainous terrain of the Kalepa Mountains to coastal plains and the Pacific Ocean. The cable landfall at Nukoliʻi Beach Park is situated in an open coastal area with a large grassy space, mixed vegetation, and nearby beach park amenities. The visual landscape of the area includes the shoreline and ocean to the east; vegetated, undeveloped lands to the south, agricultural lands to the west, and the Outrigger Kauaʻi Beach Resort to the north. The proposed terrestrial cable route follows Kauaʻi Beach Road/Drive, bordered mainly by vegetation on the makai side and by open agricultural or undeveloped land on the mauka side. The cable landfall area is visible to the public from Nukoliʻi Beach Park and shoreline, portions of Kauaʻi Beach Road/Drive, the privately-owned Outrigger Kauaʻi Beach Resort, as well as offshore waters. Views of the cable landfall area are obscured by vegetation to the west and south. The mauka section of the proposed terrestrial cable route is also visible to commuters on Kūhiō Highway. The proposed CLS location is inside a central building at KCC, surrounded by campus buildings, nearby schools to the west and north, and Kaumualiʻi Highway and residential developments to the south. The proposed CLS location is confined to the college campus area and is not visible to the general public beyond the campus boundaries.

Neither the Kauaʻi Island General Plan nor the Līhuʻe Community Plan designate scenic sites or view planes within or in the vicinity of the Kauaʻi cable landing site (County of Kauaʻi 2018; 2015). However, both plans call for preservation of scenic resources and public views, and generally emphasize the importance of protecting mauka-to-makai view planes, preserving views of significant geographic features and landforms, and preserving open space buffers between communities.

3.17.1.2 Oʻahu Cable Landing Site

The Oʻahu cable landing site is located in the industrial area of Kalealoa, which is generally characterized by flat to gently rolling coastal plains that extend from the Waiʻanae mountain range to the shoreline of the Pacific Ocean. The cable landfall is situated in a sparsely vegetated, developed beach park with several park amenities. The area is bordered by a rocky shoreline and the Pacific Ocean to the south, Germaine's Luau and Barbers Point Lighthouse to the west, and industrial sites to the north and east including a construction equipment and scrap metal recycling yards. The cable landfall area is visible to the public from Barbers Point Beach Park, the makai end of ʻŌlaʻi Street, and

the shoreline and offshore waters. Although largely obscured by vegetation, portions of the cable landfall area may be visible from Barbers Point Lighthouse and the privately-owned Germaine's Luau.

The O'ahu's General Plan (DPP 2021) does not identify specific scenic sites or view planes, but the plan's policies generally aim to protect and enhance the island's natural beauty and scenic vistas, directing public facilities, infrastructure, and utilities to be designed and located to minimize obstruction of scenic views. Among the guidelines and policies for Open Space Preservation and Development is the preservation of public views, including street and highway views, mauka-makai corridors, panoramic and landmark views, natural features, heritage resources, and view corridors between landmarks. Neither the Open Space Map nor the list of significant views and vistas in the 'Ewa Development Plan Area identify specific scenic views within the Project Area or immediate vicinity.

3.17.1.3 Maui Cable Landing Site

The cable landing site is located on the northern coast of Maui in Kahului. Kahului is situated on relatively flat coastal plains that gently slope towards the Pacific Ocean from the mountainous terrain of the West Maui Mountains and Haleakalā. The cable landfall is located on the western harbor breakwater area, which is an undeveloped man-made feature that is part of HDOT's harbor facility. The area features an undeveloped sand/gravel lot with sparce, low-lying vegetation and few harbor facilities including the Hale Kiawe Senior Fishing Clubhouse and public boat ramp. The visual landscape includes broad views of the open ocean and coastline to the north, and a mountainous backdrop of the West Maui Mountains and Haleakalā to the west and east, respectively. The area is bordered to the southwest by Kahului Beach Road, beyond which is Keōpūolani Regional Park and the Maui Arts & Cultural Center. The cable landfall area is visible to the public from Kahului Harbor, nearby shoreline, offshore waters and makai portions of Keōpūolani Regional Park. The cable landfall area is also visible to commuters on Kahului Beach Road fronting Kahului Harbor. The proposed CLS would consist of a new modular structure on the northern side of the UH Maui College campus in an area currently used as a recycling center. The area surrounding the CLS location includes UH campus buildings and agricultural facilities to the south and east, a solar array to the west, and Wahinepio Avenue and Keōpūolani Regional Park to the north. The CLS area is visible to the public from Wahinepio Avenue and nearby campus buildings.

The Maui Island Plan and Wailuku-Kahului Community Plan do not designate specific scenic sites or view planes within or in the vicinity of the Maui cable landing site (County of Maui 2002, 2012). However, both plans call for protection of scenic resources, including views of Haleakalā, `Īao Valley, surrounding islands, mauka-to-makai view planes, ridgelines, shoreline areas, and open spaces. Policies also seek to reduce light pollution to protect night skies and safeguard scenic roadway corridors identified in the Scenic Resources Inventory and Mapping Project; none of the roadways proximate to the Maui cable landing site are identified as scenic roadway corridors (Hart 2006).

3.17.1.4 Molokai Cable Landing Site

The cable landing site is located on the southern coast of Molokai, in Kaunakakai, which is the island's main population and commercial hub. Kaunakakai is situated in a relatively flat coastal plain with gentle slopes extending inland from the Pacific Ocean. The cable landfall near Kaunakakai Harbor is

located in a mostly open coastal area with bare ground, low vegetation, and buildings associated with the Molokai Yacht Club. To the south and east are facilities associated with Malama Cultural Park, Molokai and Waʻakapaemua Canoe Clubs, beyond which is Kaunakakai Wharf and Harbor. To the north is a variety of commercial and industrial buildings, beyond which is Mauna Loa Highway. To the west is mostly undeveloped flat land with sparse vegetation. The cable landfall area is visible to the public from Kaunakakai Wharf and Harbor, Malama Cultural Park, adjacent shoreline areas and offshore waters. The mauka portion of the proposed underground terrestrial cable route is also visible to the public from Mauna Loa Highway and neighboring businesses. The proposed CLS is located at Molokai Education Center. Molokai Education Center includes educational facilities and landscaped grounds, with an undeveloped field and Duke Maliu Regional Park to the west, heavily vegetated land immediately north and to the east, and Kamehameha V Highway to the south with a combination of undeveloped vegetated land and residential properties beyond. The CLS area is visible to the public from the Molokai Education Center, the sports fields associated with Duke Maliu Regional Park, Kamehameha V Highway, and residences to the southwest beyond the highway.

The Molokai Island Community Plan (County of Maui 2018) does not designate specific scenic sites or view planes near the Maui cable landing site but recognizes Molokai's abundant and diverse scenic resources, including natural landscapes like ocean views, ridgelines, valleys, historic structures, and open spaces.

3.17.1.5 Lānaʻi Cable Landing Site

The cable landing site is located in Mānele on the southern coast of Lānaʻi. Mānele is characterized by gentle hills and low-lying terrain and a rugged coastline with cliffs and rocky shores transitioning into sandy beaches and coves. The cable landfall would be at the Mānele Small Boat Harbor; the immediate visual setting surrounding the cable landfall is characterized by a series of parking lots for vehicles and boats, harbor-related buildings, and other infrastructure associated with the harbor including ramps and a jetty. East of the cable landfall is Mānele Bay, rocky coastline, and the cliffs of Kalaeokahano Point. Beyond the immediate surroundings, the cable landfall is generally surrounded by heavily vegetated, undeveloped land. The cable landfall area is partially visible to the public from portions of the harbor facility and Mānele Bay.

The Lānaʻi Community Plan (County of Maui 2016) does not designate specific scenic sites or view planes near the Lānaʻi cable landing site but recognizes the island’s scenic sites and view corridors including natural views of the ocean, hills, valleys, ridgelines, and coastlines.

3.17.1.6 Hawaiʻi Island Cable Landing Site

The cable landing site is located in Hilo on the eastern coast of Hawaiʻi Island. Hilo is characterized by a relatively flat coastal plain that gradually rises into the eastern slopes of Mauna Kea and Mauna Loa. The cable landfall site is located at PACRC just east of the Hilo Harbor breakwater. The site features an open lawn with a series of aboveground tanks, tents, and outbuildings associated with onsite research activities. To the north is a small cove with a vegetated, rocky shoreline, open waters of Puhi Bay and the Pacific Ocean. To the east is a county wastewater pump station as well as Keaukaha Beach Park, which extends along the shoreline makai of PACRC. To the south, across Kalaniana‘ole Avenue, is the

DHHL Keaukaha homestead residential tract. To the west is the Hilo breakwater, which delineates the eastern boundary of Hilo Harbor. The cable landfall area is visible to the public from the shoreline, offshore waters, the adjacent portion of Kalaniana‘ole Avenue and neighboring residences in the Keaukaha community. PACRC buildings and vegetation largely obstruct views of the cable landfall from Keaukaha Beach Park. The proposed CLS location is on the northern side of the UH Hilo campus near Lanikāula Street and is immediately surrounded by campus buildings. The proposed CLS location is confined to the college campus area and is not visible to the general public beyond the campus boundaries.

The Final Draft of the County of Hawai‘i General Plan 2045 (County of Hawai‘i Planning 2024) inventories natural beauty sites on Hawai‘i Island and includes policies for structural setbacks, preserving scenic transportation corridors, reviewing construction impacts on natural beauty, encouraging development that complements the environment, and protecting culturally significant geological features. Notably, Table 4 identifies the viewpoint and shoreline at Leleiwi Point (TMK 2-1-011:005), near the cable landfall at PACRC, as a designated natural beauty site.

3.17.2 Potential Impacts and Mitigation Measures

Short-term visual effects would occur during construction of the Project as a result of construction activities and the presence of equipment and crews at each cable landing site. As described in Section 2, construction activities would include excavation for the BMH and HDD activities at the cable landfall; trenching and/or drilling for underground conduit associated with the terrestrial cable; installation of new CLS structures and emergency generators; and offshore cable-laying activities. These activities would be visible to varying degrees from locations surrounding each cable landing site. In many areas, intervening structures and vegetation screen views toward the Project Area, such that views of the Project would be either fragmented or blocked; any unobstructed views of the construction work areas would be seen in the context of surrounding development including adjacent roadways, utility structures, harbor facilities, and other forms of development. Furthermore, visual impacts associated with construction activities would be short-term, as construction equipment and crews would be removed from the Project Area once construction is complete.

Following construction, all temporarily disturbed areas would be returned to pre-existing conditions. All Project components associated with each cable landfall would be located entirely underground; the only visual evidence of the cable landfall infrastructure would be an at-grade BMH manhole cover. The only aboveground structures associated with the Project would be the new CLS structures at UH Maui College (Maui), Molokai Education Center (Molokai), and UH Hilo (Hawai‘i Island), as well as a new stand-alone emergency generator at KCC (Kaua‘i). As previously described, the CLS facilities at UH Maui College would be visible from Wahinepio Avenue and nearby campus buildings; the CLS at Molokai Education Center would be visible from portions of Duke Maliu Regional Park, Kamehameha V Highway, and residences to the southwest beyond the highway. The Project components at UH Hilo and KCC would not be visible beyond the campus boundaries. The new CLS facilities would be relatively small modular structures; the Maui and Hawai‘i Island CLS would be approximately 768 square feet in size (24 by 32 feet) and the Molokai CLS would be approximately 96 square feet (approximately 8 feet by 12 feet). These new CLS structures (as well as the Kaua‘i CLS, consisting of

space in an existing building) would also include an emergency backup generator installed on an adjacent concrete pad. The new CLS structures would be installed entirely on UH properties, and would be designed to match the form, color, and texture of surrounding campus buildings; they would not extend above any of the existing structures and would not block or obstruct views from any surrounding areas. For these reasons, the Project is not expected to significantly impact visual resources.

3.18 Socioeconomic Resources

3.18.1 Affected Environment

3.18.1.1 Population

The State of Hawai'i had a total estimated population of 1.45 million in 2024, with the City and County of Honolulu accounting for more than two-thirds (69 percent) of the total (Table 3-17).[25] From 2010 to 2024, the state experienced an estimated net gain of almost 86,000 residents, with much of this increase in Kaua'i and Hawai'i counties. Statewide, Hawai'i had an estimated population density of 225 people per square mile (people/square mile) in 2024, more than twice the national average (96 people/square mile) (U.S. Census Bureau 2025a). The relatively high statewide population density is due to the City and County of Honolulu, which, as noted, accounts for more than two-thirds of the total state population, with an estimated population density of 1,663 people per square mile (Table 3-17). Estimated population densities in the other four counties ranged from 6.8 people per square mile (Kalawao County) to 141 people per square mile (Maui County).

Honolulu is the only incorporated municipality in Hawai'i, the state capitol, and the only urban area with 50,000 or more residents. Based on this definition (50,000 or more residents), the populations of the other four counties are all considered rural. In addition, an estimated 26 percent of the population of Honolulu County is considered rural, with remote coastal communities like Kahuku and Wai'anae considered 100 percent rural (DBEDT 2024a).

Table 3-17. Summary of Population by County

Geographic Area	2010[1/]	2020[1/]	2024[2/]	2010 to 2024		Population Density (2024)	Land Area	Share of Total
				Net Change	Percent Change			
Kaua'i County	67,091	73,298	73,840	6,749	10%	119.1	620	5%
Honolulu County	953,207	1,016,508	998,747	45,540	5%	1,662.8	601	69%
Maui County	154,834	164,754	163,688	8,854	6%	140.9	1,162	11%
Kalawao County	90	82	81	-9	-10%	6.8	12.0	0%
Hawai'i County	185,079	200,629	209,790	24,711	13%	52.1	4,028	15%
State of Hawaii	**1,360,301**	**1,455,271**	**1,446,146**	**85,845**	**6%**	**225.2**	**6,422**	**100%**

Source: U.S. Census Bureau 2025a
1/ Population data for 2010 and 2020 are decennial counts from April 1 of each respective year.
2/ Population data for 2024 are annual estimates for July 1, 2024.

[25] The City and County of Honolulu, a consolidated city-county, is also referred to as Honolulu County in this section.

Population is projected to increase statewide and in all four of the larger counties (Table 3-18).[26] Statewide, population is expected to increase by 8 percent (almost 110,000 people) from 2020 to 2050. Population in Honolulu County is expected to increase by just 5 percent over this period, accounting for less than half (44 percent) of the projected statewide increase of 110,000 people. Projected population increases from 2020 to 2050 in the other three counties range from 12 percent (Maui County) to 15 percent (Hawai‘i County).

Table 3-18. Population Projections by County (2020 to 2050)

Geographic Area	2020[1/]	2030[2/]	2040[2/]	2050[2/]	2020 to 2050		
					Net Change	Percent Change	Share of Net Change (%)
Hawai‘i County	200,712	215,570	224,460	230,730	30,018	15%	27%
Honolulu County	1,012,305	1,033,600	1,054,670	1,060,110	47,805	5%	44%
Kaua‘i County	73,186	78,360	82,440	85,180	11,994	16%	11%
Maui County	164,840	173,520	181,000	184,870	20,030	12%	18%
State of Hawaii	**1,451,043**	**1,501,150**	**1,542,570**	**1,560,890**	**109,847**	**8%**	**100%**

Source: Hawai‘i DBEDT 2024b
1/ Population data for 2020 are estimates for July 1 from the U.S. Census Bureau.
2/ Projections are for July 1 of each year.

3.18.1.2 Broadband Availability

Statewide, efforts are underway to accurately map unserved and underserved areas (DBEDT 2020). Data compiled by the U.S. Census Bureau, American Community Survey (ACS) are summarized for the four larger counties and state in Table 3-19. Viewed by county, the estimated shares of households with a broadband internet subscription range from 88.7 percent (Maui County) to 93.8 percent (Kaua‘i County). Using earlier data (2014-2018) from the same source, Hawai‘i DBEDT (2020) mapped the estimated share of households without internet by Census block group and identified areas in all four counties where one-third to two-thirds of households do not have internet access.[27]

[26] DBEDT (2024b) does not include projections for Kalawao County, most likely reflecting its very small population, an estimated 81 residents in 2024 (Table 3-17).
[27] Census block groups are a statistical division used for data presentation. Census block groups consist of a collection of census blocks and typically contain between 600 and 3,000 people (U.S. Census Bureau 2022).

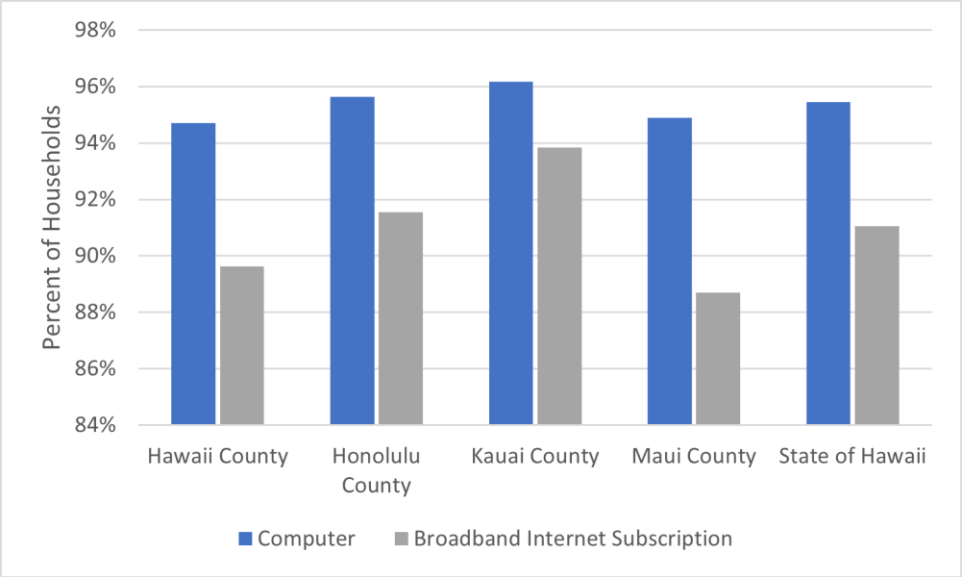


Table 3-19. Share of Households with a Computer and Broadband Internet Subscription

1/ Data compiled as part of the American Community Survey are annual estimates for 2023 based on 5-years of data (2019-2023).
Source: U.S. Census Bureau 2025b

3.18.1.3 Economic Conditions

Summary economic information is presented in Table 3-20. The statewide average annual unemployment rate was 3.0 percent in 2024. Viewed by county, unemployment ranged from 2.6 percent in Kauaʻi County to 4.4 percent in Maui County. Estimated per capita income for the state as a whole was $44,823 in 2023, ranging from 86 percent of the state per capita in Hawaiʻi County to 103 percent in Honolulu County.

The top three economic sectors by employment in 2023 in Honolulu County and statewide were government, accommodation and food services, and health care and social assistance. Government, accommodation and food services, and retail trade were the most important sectors in Hawaiʻi County. In Kauaʻi and Maui counties, accommodation and food services, government, and retail trade were the largest employers.

Table 3-20. Economic Conditions

Geographic Area	Labor Force	Unemployment Rate	Per Capita Income[1/]	Percent of State/U.S. Per Capita[2/]	Top Economic Sectors by Employment[3/]
Hawaiʻi County	90,950	3.2	$38,406	86%	Government (19.0%); Accommodation and food services (16.1%); Retail trade (12.3%)
Honolulu County	470,950	2.7	$46,361	103%	Government (20.6%); Accommodation and food services (13.9%); Health care and social assistance (12.3%)
Kauaʻi County	36,850	2.6	$42,553	95%	Accommodation and food services (26.7%); Government (14.7%); Retail trade (10.8%)
Maui County	81,550	4.4	$44,403	99%	Accommodation and food services (23.8%); Government (11.8%); Retail trade (10.9%)

Geographic Area	Labor Force	Unemployment Rate	Per Capita Income[1/]	Percent of State/U.S. Per Capita[2/]	Top Economic Sectors by Employment[3/]
State of Hawaii	**680,300**	**3.0**	**$44,823**	**104%**	**Government (23.3%); Accommodation and food services (14.2%); Health care and social assistance (10.4%)**

Source: Hawai'i DBEDT 2025a, 2025b; U.S. Census Bureau 2025a
1/ Per capita income estimates are from the ACS 2019-2023 5-year estimates compiled by the U.S. Census Bureau. Estimates are annual totals for 2023 based on five years of data.
2/ County per capita income estimates are shown as a percent of the state average; the state figure is shown as a percent of the national average ($43,289 in 2023).
3/ Top economic sectors by employment are identified from data compiled by the Hawai'i DBEDT and include employers and employees covered under uninsurance programs, as well as self-employed workers.

Employment is projected to increase statewide and in all four larger counties. Statewide, the number of jobs is projected to increase by 15 percent (126,000 jobs) from 2020 to 2050, with more than half (58 percent) of this increase expected to take place in Honolulu County (DBEDT 2024b). The health care sector is projected to have the largest job growth over the projection period, followed by the professional services sector, with technology-based innovation anticipated to be an important driver of future economic growth (DBEDT 2024b).

A statewide assessment of Hawai'i's digital economy undertaken on behalf of the Hawai'i DBEDT surveyed 1,088 private businesses across the state (OmniTrak Group Inc. 2024). The results of this survey indicated that 51 percent of private businesses engaged in digital activities to generate revenue, with almost half (46 percent) of those businesses expecting to increase revenue over the next five years and 38 percent anticipating an increase in employment. The assessment found that reliability of internet access was an issue for businesses. Approximately two-thirds (67 percent) of the surveyed businesses experienced an interruption of internet accessibility in an average month, with an average internet downtime of 9.8 hours per month. The share of businesses experiencing interruption varied by island, ranging from a low of 60 percent on O'ahu to a high of 79 percent on Kaua'i. The average monthly downtime also varied by island, ranging from 7.7 hours (O'ahu) to 13.7 hours (Maui) (OmniTrak Group Inc. 2024).

3.18.2 Potential Impacts and Mitigation Measures

Construction of the cable landing sites is expected to require approximately 3-4 months, followed by subsea cable installation, requiring approximately two months. Construction activities would provide short-term economic benefits to the various counties, with potential short-term employment opportunities for local workers and contractors. Project design and pre-development efforts to date have prioritized local services such as surveyors, geotechnical companies, civil engineers, mechanical engineers and electrical engineers; continued use of locally-based contractors and labor (e.g., equipment operators, civil and electrical contractors, transportation and logistics services, etc.) is targeted for Project construction. The Project would also generate state and local tax revenue from construction expenditures and income taxes on construction and operations wages.

Once complete, the Project would complement efforts by other parties working to provide first and last mile infrastructure to ensure that all of Hawai'i's residents have access to high-speed broadband, including currently unserved and underserved areas. Improvements to Hawai'i's infrastructure would

help meet current and future bandwidth demands associated with digital streaming and cloud technology, as well as future demand related to economic and employment growth. Improvements would also help address current business-related internet accessibility issues, reducing the number and duration of internet outages. For these reasons, construction and operation of the Project is expected to have positive short-term and long-term effects on socioeconomic resources.

3.19 Indirect and Secondary Impacts

Indirect and secondary impacts are defined in HAR Section 11-200.1-2 as those which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. These may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Potential indirect effects of the Project are generally described throughout Section 3. The environmental resources that could be indirectly impacted by implementation of the Project include (1) onshore and marine water quality as a result of erosion and sedimentation, (2) benthic habitat and other marine resources as a result of increased turbidity, (3) air quality as a result of fugitive dust, (4) noise as a result of HDD drilling and other related construction activities, and (5) traffic as a result of temporary lane closures and parking restrictions. However, with implementation of avoidance and minimization measures (as described in the respective sections), these indirect impacts are all expected to be minimal.

Improving the capacity and reliability of broadband in Hawai‘i would provide direct economic benefits (e.g., enhanced productivity for local businesses, increased e-commerce opportunities, improved digital health services, and expansion of online education opportunities), which in turn could result in secondary effects in the local economy such as industry diversification and job creation. The Project would not lead to secondary or indirect changes related to land use, development or population growth, and thus would not cause associated adverse secondary effects on infrastructure, public facilities, or housing.

3.20 Cumulative Impacts

Cumulative impacts result from the incremental effects of a proposed project when added to other past, present, and reasonably foreseeable future projects, regardless of the person or agency that undertakes the other projects. The potential for cumulative impacts to the environment as a result of the Project was evaluated with consideration given to other projects and activities in the vicinity of the Project Area that could affect the same environmental resources within a similar timeframe. Actions that were considered include projects that were recently completed, are currently underway, or are expected to occur in the foreseeable future; these include installation of other subsea cable infrastructure, harbor dredging and improvement efforts, utility upgrade projects, expansion and improvement of UH campus facilities, and ongoing vessel traffic and harbor activities. As further discussed below, impacts associated with these projects have been, or are expected to be, addressed through the respective environmental review and regulatory processes. When considered in combination with the potential impacts of the HIFL Project, it is anticipated that any potential

cumulative impacts would be limited to short-term construction-related impacts such as those related to air quality, stormwater, noise, traffic, and terrestrial and marine biological resources. However, as detailed throughout this document, BMPs would be implemented to avoid and minimize the impacts of the HIFL Project (and it is expected that similar measures would be implemented for the other projects under consideration), such that any cumulative impacts are anticipated to be less than significant.

As previously described, the vast majority of broadband connectivity is delivered via subsea cable systems. While multiple cables have previously been installed across the state, these are generally in different locations than those proposed as part of the Project. In fact, the cable landing sites for the HIFL system have been strategically sited to be in unique locations from previously installed cable systems as a means to increase overall redundancy and reliability. While the Project has sought to diversify the cable landing sites as part of the middle mile infrastructure, it has purposefully been designed to align and maximize potential synergies with proposed first mile infrastructure. As described in Section 2.4.2, the proposed landing site on Oʻahu was selected to be at Barbers Point Beach Park to allow for collocation with the OSCT Project, which would link Hawaiʻi to the continental U.S., other Pacific Islands, Australia, and Japan. While the two systems would have independent utility and serve different purposes (i.e. first mile versus middle mile infrastructure), collocating HIFL's cable landfall with the OSCT system could allow for shared use of the cable landing infrastructure, thus providing economies of scale and more efficient use of resources while also minimizing environmental impacts. The OSCT Project would involve installation of six HDD conduits and associated BMHs, along with three subsea cables for the proposed first mile system.[28] In addition, the OSCT Project involves an underground conduit system within public ROW between the cable landfall at Barbers Point Beach Park and a proposed telecommunication facility on the UH West Oʻahu campus. The impacts of the OSCT Project, as described in the Final EA (ICF 2025), include temporary and localized impacts during construction as related to air quality, soils, noise, traffic, recreational resources, as well as terrestrial and marine biological resources; avoidance and minimization measures would be implemented to reduce impacts, with all construction impacts expected to be temporary and minor. The cable landfall infrastructure at Barbers Point Beach Park would be installed below ground and would not be noticeable or have long-term effects during operations. Once installed, collectively, the HIFL and OSCT projects would augment one another to provide robust first mile and middle mile broadband infrastructure for the State of Hawaiʻi, resulting in substantial economic and social benefits for government agencies, businesses, and residents across the state.

Several of the other cable landing sites are located in the vicinity of an existing state harbor facility; as described in Section 3.13, these include Kahului Harbor (Maui), Kaunakakai Harbor (Molokai), Mānele

[28] As described in Section 2.4.2, HIFL's cable landfall has been sited and designed in collaboration with the OSCT Project, to ensure compatibility with their proposed first mile infrastructure. Specifically, the two HDD conduits and BMHs described throughout this document for the HIFL Project directly correspond to two of the six HDD conduits and BMHs proposed as part of the OSCT Project. Based on the anticipated timeline for implementation of the two projects, the OSCT cable landing infrastructure could be built prior to the HIFL Project; in this case, HIFL would execute an agreement to use the OSCT infrastructure (e.g., two HDD conduits and BMHs) for the Oʻahu cable landfall. However, recognizing there is a risk that the OSCT Project may not proceed, this Draft EA assumes the necessary cable landing infrastructure would be constructed as part of the HIFL Project.

Small Boat Harbor (Lānaʻi), and Hilo Harbor (Hawaiʻi Island). These facilities are actively managed state-owned facilities that require routine maintenance and improvement projects. Although no major construction efforts are known to be in the planning or execution stages, it is understood that funding continues to be programmed at the state level for general harbor improvements (HDOT 2025). In addition to infrastructural improvements, these harbors require periodic dredging; dredging was recently completed by the USACE at both Kahului Harbor and Kaunakakai Harbor in 2024. Dredging related impacts generally include increased turbidity and suspended sediment, which can temporarily impact marine fauna and benthic habitat, as well as noise and vessel traffic; it is understood that BMPs (e.g., turbidity curtains) were implemented to minimize potential impacts of these dredging projects (USACE 2024a,b).

Proximate to the Hawaiʻi Island cable landing site, the County of Hawaiʻi Department of Environmental Management (DEM) is currently undertaking the Hilo Wastewater Treatment Plant Rehabilitation and Rehabilitation Project, which involves rehabilitation and replacement of facilities to improve the treatment processes and address deficiencies at the Hilo Wastewater Treatment Plant. While the treatment plant is located several miles inland, there is documented evidence of wastewater in the nearshore waters of Puhi Bay, which adversely affects marine wildlife, water quality, recreation, and cultural uses in nearshore waters (UH Hilo 2025). By restoring wastewater treatment capacity and improving efficiency, it is anticipated that the project would help to reduce pollutant loads. As detailed in the environmental review documentation for this project (Wilson Okamoto 2024), short-term construction impacts are expected to include increased fugitive dust, noise, and construction-related traffic; these impacts would be mitigated through implementation of BMPs and compliance with applicable federal, state, and county rules and regulations.

As described in Section 2.3.5, the CLS facilities have been purposefully sited to be located on properties owned by UH to the extent possible. Specifically, the Project would include a new modular structure with emergency generator at the UH Maui College (Maui), Molokai Education Center (Molokai), and UH Hilo (Hawaiʻi Island) campuses; a stand-alone emergency generator would also be installed at the KCC campus on Kauaʻi. Similar to the harbor facilities described above, these are state-owned facilities that require routine maintenance and improvement, including building renovations, utility and mechanical improvements, and other campus upgrades. Although no major construction efforts are known to currently be in the design or construction phase, it is understood that improvement projects have been identified for the various campuses through master planning efforts. In particular, potential expansion of the Molokai Education Center is being pursued; although environmental review has been completed, the specific timing for the proposed work has not yet been determined. The anticipated impacts of the proposed expansion, which are expected to be similar to other campus improvement projects, include short-term construction impacts to air quality, noise, solid waste generation, and storm water; these would be addressed through implementation of BMPs and compliance with federal, state, and county regulations and permit requirements (PBR 2020).

No past, present or reasonably foreseeable projects are known along the proposed cable route; however ongoing activities in the offshore environment include recreational and commercial fishing, military training and related activities, commercial shipping, and other vessel transit. As detailed in Section 3.6, placement of the cable along the seafloor between the islands could impact marine

resources, including EFH. However, collectively for all cable landing sites and interisland channels, only approximately 2.1 acres of EFH would be impacted across the cable's full linear extent; BMPs and other measures described in Section 3.6.3 would be implemented to avoid and minimize potential Project effects to marine resources. Given the relatively low intensity and occurrence of stressors expected as a result of the Project when considered together with other potential activities in the offshore environment, the Project's contribution to cumulative impacts on EFH and other marine resources is expected to be negligible.

4 ALTERNATIVES TO PROPOSED PROJECT

This section discusses alternatives to the Project described in Section 2 and evaluated in Section 3. The range of alternatives addressed include the following: (1) no action, (2) use of alternative technologies, (3) alternative cable route and/or landing sites, (4) alternative Project size, and (5) delayed Project implementation. Discussion of each alternative is provided below, along with the rationale for dismissal from further consideration.

4.1 No Action Alternative

Under the No Action Alternative, federal grant dollars allocated to address the critical need for capacity and resilience in Hawai‘i’s telecommunications infrastructure would not be leveraged and the HIFL Project would not be constructed. As such, there would be no Project-related ground disturbance or construction-related impacts associated with cable landing infrastructure at the various cable landing sites, nor placement of the subsea cable in state and federal waters between the six main Hawaiian Islands.

In the absence of the HIFL Project, there would be no near-term development of carrier-neutral middle mile broadband infrastructure to provide more robust and reliable high-speed broadband access across the State of Hawai‘i. Based on a recent survey, it is estimated that two-thirds (67 percent) of private businesses statewide currently experience an interruption of internet accessibility in an average month, with average downtimes of about 10 hours per month (DBEDT 2020, OmniTrak Group Inc. 2024). Under the no action alternative, these trends would continue and would be further exacerbated as statewide population and technology-based services continue to grow. As demand for high-speed broadband increases—driven by telehealth, distance learning, disaster response, and business operations—the legacy systems’ limited bandwidth and lack of redundancy would lead to degraded service quality, higher latency, and greater risk of prolonged communication blackouts in the event of cable damage. Continued deterioration of the current cables would also likely force more frequent emergency repairs, resulting in the potential for unplanned seabed disturbance and increased vessel traffic under compressed timelines and without the benefit of advanced route planning. Over time, failure to invest in a robust, resilient network would undermine Hawai‘i’s economic competitiveness, emergency preparedness, and ability to support necessary and beneficial digital services for residents, while deferring environmental impacts associated with infrastructure construction into uncertain future scenarios.

Although other broadband infrastructure projects could progress in the absence of the HIFL Project (e.g., new first mile connectivity to continental U.S. and international locations and/or new last mile connectivity within individual communities), without a robust middle mile interisland system in place, overall broadband capacity, reliability, and access across the state will continue to be constrained.

4.2 Use of Alternative Technologies

While there are several alternative technologies that can deliver broadband service, high-capacity satellite and microwave systems are the only other feasible options in geographically remote island environments such as Hawai‘i. While these systems can provide broad coverage without seabed

disturbance, they typically require more land-based infrastructure (e.g., microwave towers) and do not offer the same capacity, performance, or reliability as subsea fiber optic cable systems.

Bandwidth is the maximum amount of data that can be transmitted over a communications network in a given amount of time, typically measured in bits per second. Bandwidth is important because higher capacity enables more users and data-intensive applications (such as high-definition video streaming and large-scale cloud-based data transfers) to function effectively without congestion. Individual satellite systems typically provide total capacity in the range of several hundred gigabits per second, whereas modern subsea fiber optic cables can support several hundred terabits per second."[29]

Latency is the time delay between sending and receiving data across a communications network, typically measured as the round-trip time in milliseconds (ms). Latency is important because delays in data transmission can disrupt real-time applications, such as telehealth consultations and emergency response communications. Subsea fiber optic cables provide very low latency (approximately 5–15 ms round trip), while low Earth orbit satellites achieve approximately 30–50 ms if routed locally or approximately 100–150 ms if routed via mainland gateways. Geostationary satellites incur much higher delays of approximately 500–700 ms, regardless of the short geographic distance.

In addition to bandwidth and latency constraints, satellite and microwave systems are more vulnerable to atmospheric and weather conditions (e.g., rain fade) and can be affected by line-of-sight obstructions, which can collectively affect system reliability. Once installed, subsea fiber optic systems are unaffected by atmospheric or weather variability, with reliability generally only affected by accidental damage to the cable (which typically only occurs once or twice over a cable's design life).

While satellite and microwave systems provide a wireless alternative for delivery of broadband, these systems cannot match the combination of ultra-low latency, consistent reliability, dedicated capacity and future growth potential offered by subsea fiber optic cable. Given the need to replace the State of Hawai'i's existing middle mile assets with a robust and reliable broadband system to support cloud-based and other digital technology moving into the future, subsea fiber optic cable is the only viable technology. As such, this alternative was dismissed from further consideration.

4.3 Alternative Cable Route and Landing Sites

As described in Section 2.2, a detailed siting study was conducted to comprehensively analyze potential cable routes and corresponding landfalls for an interisland fiber optic cable system across the State of Hawai'i. This effort included identification and evaluation of a range of options based on site characteristics including bathymetry and seabed conditions in the offshore and nearshore areas, commercial maritime activities, existing offshore and onshore infrastructure, recreational uses, sensitive environmental and cultural resources, and accessibility. Other factors that were considered include proximity to the existing telecommunications network and other land-based infrastructure (to facilitate interconnection) and uniqueness from other cable landing sites (to increase resiliency of the state's overall broadband network). Through this process, a variety of different landfalls and

[29] One gigabit is equal to 10^9 bits and one terabit is equal to 10^{12} bits; therefore, a terabit is one thousand times larger than a gigabit.

associated cable routes were considered but dismissed from further consideration, for example, due to lack of technical feasibility or potential for significant impacts. The study concluded with identification of a recommended cable route and preferred cable landing sites that collectively achieve the specified criteria. These results were used to inform the ensuing planning and design process, including site-specific due diligence surveys and subsequent design refinements (as described in Section 2.2.2), resulting in the cable landing sites and cable route described as part of the Project.

As the detailed siting study and subsequent analyses determined that the cable route and landfalls described herein offer the best balance in terms of technical feasibility and constructability, potential environmental and cultural impacts, and connectivity to the state's overall broadband network, these were carried forward for detailed impact assessment as part of the Project. The other routes and landing sites identified and evaluated through that process were found not to achieve the criteria to as great of an extent and therefore were not carried forward for further evaluation.

4.4 Alternative Project Size

An alternative Project size could involve either a different capacity (i.e. fewer or more fiber pairs within the cable) and/or a different number of cable landfalls. As noted in Section 2.1, each cable segment was designed to include a designated fiber count, which was determined based on the projected system demand specific to each cable landing site. Installing a system with less capacity would fail to meet each island's anticipated long-term needs across critical sectors such as health care, education, emergency response, business, and commerce. The need for additional capacity could necessitate an early supplemental build or upgrade, resulting in additional environmental disturbance and costs over time. Conversely, an oversized system could require additional cables and larger terrestrial facilities, thus resulting in greater disturbance, while also incurring unnecessarily high capital and maintenance expenses for capacity unlikely to be fully utilized within its design life. By selecting the right-sized cable based on detailed demand forecasting, the Project ensures both long-term service reliability and cost-effectiveness while minimizing overall impact. Similarly, the geographic extent of the system was designed to ensure the middle mile infrastructure enables broadband access to residents across the state. Building a system with fewer cable landing sites would invariably result in certain islands not receiving improved broadband connectivity to meet residents' current and future needs.

As the Project has been deliberately sized to meet the projected demand and enable access for residents across the state, differing Project sizes (either in terms of capacity or extent) were not carried forward for further evaluation.

4.5 Delayed Implementation

An alternative involving construction of the Project at a future date was considered but not carried forward for detailed analysis for several reasons. The federal funding received via the U.S. Treasury CPF program and allocated by the state for construction of the HIFL Project requires expenditures in accordance with a specific timeline. As such, delaying implementation of the Project would jeopardize those federal funds, which would significantly increase the state's financial burden for construction of

a new subsea fiber optic cable system. In addition, as described in Section 1.2, Hawaii's existing middle mile broadband infrastructure is aging, with two of the three existing systems having already exceeded their design life (and the third aging while also facing legal challenges and inadequate maintenance); furthermore, these systems no longer meet the current or future bandwidth demands associated with digital streaming and cloud technology. Deferring construction of a new system would increase the state's long-term reliance on these legacy systems, increasing the likelihood of capacity constraints, performance issues, unplanned outages and emergency repairs. As such, the state would fail to achieve its objectives for broadband resiliency and equity specified as part of the *Connect Kākou* initiative. Moreover, delayed implementation would defer Project-related impacts into an uncertain future, when the effects of climate change, sea-level rise, and competing shoreline uses may further constrain siting options; as such, delayed implementation would not reduce potential environmental impacts but could result in increased risks. For these reasons, this alternative was dismissed from further evaluation.

5 CONSISTENCY WITH APPLICABLE REGULATIONS, PLANS, AND POLICIES

5.1 Federal

5.1.1 Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 (33 USC 401 et seq.) requires authorization from the USACE for construction of any structure in, over, or under any navigable Waters of the U.S. Navigable waters are defined as "subject to the ebb and flow of the tide and/or presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (33 CFR 325.5(c)(2)). As the Project involves placement of a subsea cable on the seafloor and HDD conduits extending seaward of the mean high water line to facilitate cable landfall at the six cable landing sites, it constitutes construction of a structure in navigable waters and requires Section 10 authorization.

The USACE's NWP program is a streamlined permitting process that authorizes categories of routine activities in federally jurisdictional waters that have no more than minimal adverse environmental impacts (e.g., small stream crossings, utility line installation, maintenance dredging) under a set of uniform terms and conditions. Each NWP category includes general and regional conditions; activities that exceed those limits or pose greater environmental risk require an individual permit with a more detailed review. NWP 57 (*Electric Utility Line and Telecommunication Activities*) authorizes activities required for the construction, maintenance, repair, and removal of electric utility lines, telecommunication lines, and associated facilities in Waters of the U.S. and structures or work in navigable waters, provided the activity does not result in the loss of greater than 0.5-acre of Waters of the U.S.[30] Under NWP 57, a pre-construction notification (PCN) is required to be submitted to the USACE for Section 10 authorization prior to the commencement of work. Regional conditions established by the USACE Honolulu District also require demonstration of compliance with General Condition 18 (Endangered Species), General Condition 20 (Historic Properties), and EFH provisions of the Magnuson-Stevens Act (see Sections 5.1.3 through 5.1.6). Based on consultation with the USACE Honolulu District, the Project is expected to qualify for authorization under NWP 57. In accordance with these requirements, a PCN package and associated documentation will be submitted to USACE Honolulu District Regulatory Branch to request authorization for the Project. As part of their review process, the USACE will also consult with other federal agencies to ensure compliance with applicable federal laws, as further discussed below.

5.1.1.1 Section 408 Program

Under the USACE Section 408 Program,[31] any entity that proposes to alter, either temporarily or permanently, or permanently occupy or use a federally authorized public works project must be authorized to ensure that proposed alterations would not impair the safety, integrity, or functionality of the public works project or be contrary to the public interest. Public works projects include dams,

[30] The current NWPs, which were authorized in 2021, expire on March 15, 2026. On January 8, 2026, the USACE issued revised NWPs, which take effect upon expiration of the current NWPs (USACE 2026). NWP 57 is carried forward as part of the revised NWPs; the only modification is a revised note with information that the permittee should provide to the NOAA National Ocean Service and USCG regarding the project.

[31] This requirement was first established under Section 14 of the Rivers and Harbors Act of 1899 but is now codified at 33 USC 408.

basins, levees, channels, navigational channels, dredge maintenance and disposal areas, and any other local flood protection works constructed by the USACE.

As described in Section 3.13.1.1, the various harbors in the vicinity of the cable landing sites are all USACE public works projects subject to Section 408 authorization. The Project has been sited and designed to avoid the limits of the federally authorized public works projects in all cases except Kaunakakai Harbor on Molokai. In this location, the cable would be routed along the far western edge of the harbor basin but would encroach slightly into the limits of dredging in order to minimize potential impacts to coral located immediately adjacent to the harbor basin.

The general conditions of the USACE's NWP program specify that any NWP activity that will alter or temporarily or permanently occupy or use a USACE authorized civil works project must include a statement in the PCN confirming submittal of a written request for Section 408 permission from the USACE office with jurisdiction over the civil works project; NWP authorization will not be issued until Section 408 review is complete. In accordance with these requirements, a written request for Section 408 permission regarding placement of the subsea cable along the edge of the Kaunakakai Harbor Basin will be submitted to the USACE Honolulu District Section 408 coordinator as part of the PCN submittal process.

5.1.2 Clean Water Act

5.1.2.1 Section 404

The purpose of the Clean Water Act is to "restore and maintain the chemical, physical and biological integrity of the nation's waters" (33 USC §1251(a)). Section 404 of the Clean Water Act prohibits the discharge of dredged or fill material into Waters of the U.S. without a permit from the USACE. The current definition of Waters of the U.S. includes various categories of waters such as tributaries of traditional navigable waters that are relatively permanent, standing or continuously flowing bodies of water and certain adjacent wetlands (Department of Army and EPA 2023b, EPA 2024). As described in Section 3.4, the cable landing sites were surveyed to identify potential Waters of the U.S. and to delineate any such features; the resulting delineation reports will be submitted to the USACE for verification as part of the PCN package. The Project has been designed to avoid potential Waters of the U.S. identified through the delineation process, and as such, is not expected to require Section 404 authorization.[32]

5.1.2.2 Section 401, Water Quality Certification

Under Section 401 of the Clean Water Act (33 USC § 1341), any applicant for a federal license or permit that may result in a discharge into Waters of the U.S. must first obtain a Water Quality Certification (WQC) from the relevant state or authorized tribe, affirming that the project will comply with all applicable water quality standards. In Hawai'i, the HDOH Clean Water Branch administers the Section 401 WQC program, as authorized under HRS Chapter 342D.

Effective April 28, 2022, HDOH Clean Water Branch issued Blanket Section 401 WQC for the 2021 NWPs, pre-certifying that activities authorized by those permits comply with state water quality standards so

[32] The USACE does not consider laying cable on the seabed nor drilling underneath wetlands to be discharge of fill (V. Koskelo/USACE, pers. comm. March 2023).

long as permittees meet the state's general and NWP-specific conditions. As such, activities permitted under NWP 57 are currently covered under the Blanket Section 401 WQC.[33] Under the Blanket WQC, an application does not need to be submitted to the HDOH Clean Water Branch; rather compliance with the Blanket WQC is verified through the USACE's PCN review process, and the conditions of the Blanket WQC would be incorporated into the NWP authorization.

5.1.2.3 Section 402, National Pollutant Discharge Elimination System

Section 402 of the Clean Water Act establishes the NPDES, under which any discharge of pollutants from a point source into Waters of the U.S. must be covered by an NPDES permit. Under the authority and oversight of the EPA, the NPDES program is administered by the DOH Clean Water Branch. The purpose of the NPDES program is to implement federal and state water pollution control requirements to help protect human health and the environment. As specified in HAR Section 11-55-04, an NPDES permit is required before discharging any pollutant or beginning construction activities that would disturb a total of one or more acres of land. Prior to construction, an NPDES permit would be obtained for construction stormwater or other potential construction-related discharge associated with the Project as needed.

5.1.3 Endangered Species Act

The ESA and its implementing regulations in 50 CFR Part 17 prohibit the take of any fish or wildlife species that is federally listed as threatened or endangered and ensures any action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat without prior approval. Section 3 of the ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct" (16 USC § 1532 [19]). Section 7 of the ESA requires federal agencies consult with NOAA Fisheries and USFWS prior to undertaking or approving an activity that may adversely affect federally listed species or critical habitat.

As part of the NWP review process, USACE is required to make a determination on whether the proposed activity would affect a federally listed species. The NWP program cannot be used to authorize any activity which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species (or a species proposed for such designation), or which will directly or indirectly destroy or adversely modify designated critical habitat (or critical habitat proposed for such designation). An NWP activity which "may affect" a listed species or critical habitat requires ESA Section 7 consultation with USFWS and/or NOAA Fisheries to obtain concurrence from the agencies on the effect determination. To streamline the Section 7 consultation process with NOAA Fisheries , the USACE and NOAA Fisheries conducted a programmatic consultation for a range of regulated actions that involve similar types of activities with similar environmental effects and required BMPs, resulting in Pac-SLOPES. Following submittal of a PCN, USACE will consult with NOAA Fisheries and USFWS to confirm that the proposed Project falls within the scope of Pac-SLOPES and is not otherwise likely to adversely affect a federally listed species or critical habitat. If it is determined the Project may affect a federally listed species or critical habitat, formal consultation would be required. Based on agency

[33] The USACE has initiated a request for WQC for the proposed set of NWPs (USACE 2025b); Blanket WQC for the proposed NWPs is expected to be similar to the existing Blanket WQC.

discussions to date, and with implementation of Pac-SLOPES and other agency recommendations, it is anticipated that informal consultation will be sufficient to comply with ESA Section 7 requirements.

5.1.4 National Historic Preservation Act

Section 106 of the NHPA of 1966, as amended (16 USC § 40 et seq.) requires federal agencies to consider the effects of a proposed action on properties eligible for inclusion in the National Register of Historic Places (NRHP) and, if applicable, develop plans to avoid, minimize, or mitigate adverse effects to those properties. "Properties" are defined as "cultural resources," which include prehistoric and historic sites, buildings, and structures that are listed in or eligible for listing in the NRHP. The U.S. Department of the Interior (DOI), National Park Service (NPS), and the Advisory Council on Historic Preservation (ACHP) administer the NHPA; at the state level, the SHPO and SHPD implement the NHPA.

As part of the NWP review process, USACE is required to make a determination on whether the activity would affect historic properties. The NWP program cannot be used to authorize any activity which may have the potential to affect properties listed (or eligible for listing) in the NRHP until the Section 106 requirements have been satisfied. If the USACE determines that the proposed NWP activity has the potential to affect historic properties, consultation is required with the SHPO and NHOs. Pursuant to 36 CFR § 800.2(c)(3), the USACE delegated their authority to UH as the non-Federal representative to conduct Section 106 consultation for the Project; UH in turn delegated the role of conducting outreach on behalf of USACE to Pacific Legacy, the archaeological firm contracted to assist with the project. An initial Section 106 consultation letter was sent to more than 230 NHOs and other entities and individuals on September 22, 2025; a consultation letter was subsequently sent to the SHPO on September 24, 2025. These letters included a summary of the LRFI, as summarized in Section 3.8.1, and sought input on historic properties within the APE and the nature of any potential effects of the Project. In a letter dated October 23, 2025, the SHPO responded with a request for an AIS that properly identifies historic properties and assesses appropriate avoidance measures, including consultation to confirm the appropriate form of AIS documentation. An AIS subsurface testing strategy was developed, provided to OHA, cultural descendants, and other appropriate consulting parties for review, and submitted to SHPD/SHPO for review on November 25, 2025. NHPA Section 106 consultation is ongoing and will be completed as part of the USACE NWP permitting process.

5.1.5 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act; 16 USC § 1801 et seq.), enacted in 1976, aims to ensure the long-term biological and economic sustainability of our nation's marine fisheries. Key objectives of the Magnuson-Stevens Act include preventing overfishing, rebuilding overfished stocks, and increasing long-term economic and social benefits. The Magnuson-Stevens Act promotes domestic commercial and recreational fishing while upholding sound conservation and management principles. In 1996, Congress amended and reauthorized the Magnuson-Stevens Act through the Sustainable Fisheries Act (Public Law 104-297) in an effort to adopt a more multispecies ecosystem-based management approach to ensure the continued productivity and sustainability of U.S.-managed fish stocks by effectively protecting their required (essential) habitat. This approach emphasizes EFH, which are "those waters and substrates essential for fish spawning, breeding, or growth to maturity."

Federal agencies are required to consult on all proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH; as such, USACE would consult with NOAA Fisheries to determine the effects of the proposed activity on EFH as part of the NWP review process. Through this process, an EFH Assessment would be submitted to NOAA Fisheries, which is responsible for reviewing and providing EFH conservation recommendations. Pursuant to Section 305(b)(3) of the Magnuson-Stevens Act, the USACE would subsequently provide a written response to NOAA Fisheries regarding the conservation recommendations.

5.1.6 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA; 16 USC §§ 1451-1456), Section 307, requires that federal actions which have reasonably foreseeable effects on any coastal use (land or water) or natural resource of the coastal zone be consistent with the enforceable policies of a state's federally approved coastal zone management (CZM) program. The CZMA federal consistency procedures and requirements are established in 15 CFR Part 930 and specify that federal actions affecting any coastal use or resource must be reviewed by the state CZM program to ensure that the proposed activities are consistent with state enforceable policies. The Hawai‘i CZM Program, codified as HRS Chapter 205A, complies with the federal CZMA, with the federal consistency provision administered by the State of Hawai‘i OPSD.

Specific to NWP 57, OPSD has issued conditional concurrence; that is, individual federal consistency review is not required unless the proposed activities involve: (1) an aggregate or single fill resulting in the permanent loss of greater than 0.10-acre of non-tidal or tidal waters of the United States; or (2) any amount of fill resulting in the permanent loss of any amount of wetlands and/or special aquatic sites (OPSD 2021). A request for federal consistency determination from OPSD will be submitted as part of the USACE NWP process as needed.

5.2 State of Hawai‘i

5.2.1 Hawai‘i State Plan (HRS Chapter 226)

The Hawai‘i State Planning Act (HRS Chapter 226) is a broad policy document relating to the statewide planning system, including all activities, programs and decisions made by local and state agencies. It is intended to “improve the planning process in this state, to increase the effectiveness of government and private actions, to improve coordination among different agencies and levels of government, to provide for wise use of Hawai‘i’s resources and to guide the future development of the state” (HRS Chapter 226-1). The State Plan serves as written guide for the long-range development of the state by describing the desired future for the residents of Hawai‘i and providing a set of goals, objectives, and policies that are intended to shape the general direction of public and private development. Part I of the State Plan lists the state’s long-range goals, objectives, policies and priorities. Part II establishes a statewide planning system to coordinate and implement the State Plan. Part III establishes priority guidelines to address areas of statewide concern.

The stated goals of the plan relate to a strong viable economy, a desired physical environment, and individual and family well-being (HRS Chapter 226-4). Overall, the Project supports these goals by providing critical infrastructure to ensure broadband connectivity for agencies, businesses, and residents across the state − connecting people to essential services, supporting economic growth, and

maintaining critical government functions – while avoiding and minimizing impacts to the surrounding environment. Consistency of the Project with applicable objectives, policies, and priority guidelines in the Hawai‘i State Plan is discussed below.

5.2.1.1 Objectives and Policies

Economy –General

Objectives:

(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.

(2) A steadily growing and diversified economic base that is not overly dependent on a few industries and includes the development and expansion of industries on the neighbor islands.

Policies:

(1) Promote and encourage entrepreneurship within Hawai‘i by residents and nonresidents of the State.

(2) Expand Hawaii's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.

(4) Transform and maintain Hawai‘i as a place that welcomes and facilitates innovative activity that may lead to commercial opportunities.

(7) Expand existing markets and penetrate new markets for Hawaii's products and services.

(12) Encourage innovative activities that may not be labor-intensive but may otherwise contribute to the economy of Hawaii.

(13) Foster greater cooperation and coordination between the government and private sectors in developing Hawaii's employment and economic growth opportunities.

(17) Stimulate the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.

Discussion: *The State of Hawai‘i recognizes broadband as foundational to Hawai‘i’s long-term economic future and, as importantly, the quality of life of its residents (DBEDT 2020). Through a public-private partnership, the Project would provide critical infrastructure that would increase access to more robust and reliable broadband for use by agencies, businesses, and residents across the six main Hawaiian Islands. By improving broadband capacity and reliability, the Project would support economic growth by enabling businesses to adopt more digital services, reach wider markets, and capitalize upon new opportunities. It would also contribute to economic diversification by attracting new industries, enabling remote workers, and facilitating virtual communication and collaboration. In doing so, the Project would*

be directly responsive to both the Hawai‘i State Plan as well as the general and community plans for the individual counties, which specifically call for a robust and reliable telecommunications network, as further discussed in Sections 5.3 through 5.6.

Economy – Federal Expenditures

Objectives:

(1) A stable federal investment base as an integral component of Hawaii's economy.

Policies:

(3) Promote the development of federally supported activities in Hawai‘i that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaii's environment.

Discussion: *The Project would be partially funded by the State of Hawai‘i using federal funding sourced from the U.S. Treasury CPF program. Through the public-private partnership, the Project would provide wide-reaching economic and social benefits for communities across the state. The Project would be constructed in an environmentally sensitive manner, and once installed, the infrastructure would have negligible impacts on the surrounding environment.*

Economy – Potential Growth and Innovative Activities

Objectives:

(1) Development and expansion of potential growth and innovative activities that serve to increase and diversify Hawaii's economic base.

Policies:

(1) Facilitate investment and employment growth in economic activities that have the potential to expand and diversify Hawaii's economy, including but not limited to diversified agriculture, aquaculture, renewable energy development, creative media, health care, and science and technology-based sectors.

(6) Expand Hawaii's capacity to attract and service international programs and activities that generate employment for Hawaii's people.

(7) Enhance and promote Hawaii's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts.

(12) Develop, promote, and support research and educational and training programs that will enhance Hawaii's ability to attract and develop economic activities of benefit to Hawaii.

(15) Increase research and development of businesses and services in the telecommunications and information industries.

Discussion: *The Project would provide critical middle mile infrastructure, which would significantly increase the capacity and reliability of high-speed internet available for agencies, businesses, and residents across the State of Hawaii, thereby supporting the growth and diversification of economic activity.*

Economy – Information Industry

Objectives:

(1) Recognition that broadband and wireless communication capability and infrastructure are foundations for an innovative economy and positioning Hawai‘i as a leader in broadband and wireless communications and applications in the Pacific Region.

Policies:

(1) Promote efforts to attain the highest speeds of electronic and wireless communication within Hawai‘i and between Hawai‘i and the world, and make high speed communication available to all residents and businesses in Hawaii.

(2) Encourage the continued development and expansion of the telecommunications infrastructure serving Hawai‘i to accommodate future growth and innovation in Hawaii's economy.

(5) Encourage greater cooperation between the public and private sectors in developing and maintaining a well-designed information industry.

(8) Foster a recognition of the contribution of the information industry to Hawaii's economy.

(9) Assist in the promotion of Hawai‘i as a broker, creator, and processor of information in the Pacific.

Discussion: *The Project would be directly responsive to the state plan objectives and policies related to the information industry by providing critical middle mile infrastructure that would deliver high capacity and reliable broadband to the six main Hawaiian Islands, thus ensuring availability of high-speed telecommunications for agencies, businesses, and residents across the state. The Project would be implemented through a public-private partnership, leveraging substantial federal funds in combination with private investment, resulting in a robust system that would support Hawaii’s position as a leader in broadband and wireless communications in the Pacific Region.*

Physical Environment – Land-Based, Shoreline, and Marine Resources

Objectives:

(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.

(2) Effective protection of Hawaii's unique and fragile environmental resources.

Policies:

(3) Take into account the physical attributes of areas when planning and designing activities and facilities.

(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.

(8) Pursue compatible relationships among activities, facilities, and natural resources.

(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.

Discussion: *The Project would involve installation of a subsea fiber optic cable with landfalls at each of the six main Hawaiian Islands, thus requiring crossing of the shoreline on each island. HDD would be used to install the cable beneath shoreline area, thus avoiding and minimizing impacts to sensitive resources along the shoreline to the extent practicable. The subsea cable would be surface laid on the ocean floor, with hand placement by divers to minimize installation impacts to sensitive resources in nearshore waters. While some corals would be impacted during installation, it is anticipated that affected corals would recolonize and no permanent loss would occur. Once installed, a majority of the cable is expected to self-bury in areas of soft substrate with segments that traverse hard bottom potentially colonized by coral. Onshore, the cable landfall infrastructure would be located at or below the ground surface. Some onshore recreational areas would be temporarily displaced by construction activities; however, public access to the shoreline would be maintained at all times. Similarly, during HDD and cable laying activities, ocean waters would remain open to the public throughout Project construction, with monitoring and buffer areas around active work areas to maintain public safety. Following construction, the Project would not have any bearing on public access. Long-term operation of the cable would have a negligible effect on land-based, shoreline, and marine resources.*

Physical Environment – Scenic, Natural Beauty, and Historic Resources

Objectives:

(1) Enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.

Policies:

(1) Promote the preservation and restoration of significant natural and historic resources.

(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.

(5) Encourage the design of developments and activities that complement the natural beauty of the islands.

Discussion: *Short-term visual effects would occur during Project construction as a result of the presence of equipment and crews at each cable landing site and along the cable route, but these would not significantly impact public views of the mountains, ocean, or other natural features. Following construction, all temporarily disturbed areas would be returned to pre-existing conditions. All cable landfall infrastructure would be located underground; visual evidence would be limited to at-grade BMH manhole covers. The only new aboveground structures to be installed as part of the Project would be the CLS structures within the developed campus at UH Maui College, Molokai Education Center, and UH Hilo, as well as a new stand-alone emergency generator at KCC. As detailed throughout this EA, detailed due diligence studies have been conducted to characterize natural and historic resources within the Project Area; the Project has been designed to avoid and minimize potential impacts, with mitigation measures to ensure any unavoidable impacts would be less than significant.*

Physical Environment – Land, Air, and Water Quality

Objectives:

(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.

(2) Greater public awareness and appreciation of Hawaii's environmental resources.

Policies:

(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.

(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.

(6) Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.

Discussion: *Construction of the Project would result in minor, localized emissions of air pollutants from heavy equipment, vehicles, and vessels, as well as fugitive dust resulting from ground disturbance. Similarly, construction activities also could potentially result in sediment and other pollutants being conveyed by stormwater runoff into nearby marine waters. Impacts to air and water quality would be avoided and minimized through implementation of BMPs as well as compliance with federal, state and local regulatory requirements (including CWA Section 401 WQC, NPDES, and county erosion control plans). Once installed, Project infrastructure is not expected to measurably affect land, air, or water quality.*

Facility Systems – General

Objectives:

(1) Water, transportation, sustainable development, climate change adaptation, sea level rise adaptation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.

Policies:

(1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.

(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.

(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.

(4) Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.

Discussion: *The Project would be consistent with statewide objectives and policies for facility systems by increasing telecommunication capabilities and reliability in support of social and economic welfare across the state. Through a public-private partnership, the Project would leverage significant federal funds to install critical broadband infrastructure that would increase access to more robust and reliable*

broadband for use by agencies, businesses, and residents across the state. In addition to achieving relevant objectives and policies of the Hawai'i State Plan, the Project would also directly support the general and community plans of the individual counties, which specifically call for robust and reliable telecommunications infrastructure to meet each island's business, educational, healthcare, and social needs (see Sections 5.3 through 5.6).

Facility Systems – Telecommunications

Objectives:

(1) Dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people.

Policies:

(b) Ensure the provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand.

(c)(1) Facilitate research and development of telecommunications systems and resources.

(c)(2) Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning.

Discussion: *The Project would be directly responsive to the state plan objective and policies relating to telecommunications systems, by developing critical broadband infrastructure through a public-private partnership. It would address a key vulnerability in the existing statewide telecommunications network, which is dependent on aging infrastructure that does not meet current or projected future bandwidth demands associated with digital streaming and cloud technology. The proposed system would provide increased capacity and reliability of telecommunications and would be sufficiently robust to meet the current and future needs of agencies, businesses, and residents across the state.*

5.2.1.2 Priority Guidelines

HRS Chapter 226 (Part II) establishes overall priority guidelines to address seven major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation. Following is a discussion of the Project's consistency with applicable priority guidelines.

Economy

Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawaii's people and achieve a stable and diversified economy:

(1) Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.

(A) Encourage investments which:

(i) Reflect long-term commitments to the State.

(iii) Diversify the economy.

(v) Are sensitive to community needs and priorities.

(2) Encourage the expansion of technological research to assist industry development and support the development and commercialization of technological advancements.

(3) Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.

(5) Streamline the processes for building and development permit and review and telecommunication infrastructure installation approval and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where scientific evidence indicates that public health, safety, and welfare would not be adversely affected.

Discussion: *As further discussed below, the Project would be directly responsive to the economic priority guidelines in the Hawai'i State Plan by providing critical middle mile infrastructure to make high capacity and reliable broadband available to agencies, businesses, and residents across the state, thus supporting economic growth and diversification statewide.*

Priority guidelines to promote the development of the information industry:

(1) Establish an information network, with an emphasis on broadband and wireless infrastructure and capability, that will serve as the foundation of and catalyst for overall economic growth and diversification in Hawaii.

Discussion: *The State of Hawai'i recognizes broadband as foundational to Hawai'i's long-term economic future and, as importantly, the quality of life of its residents (DBEDT 2020). Through a public-private partnership, the Project would provide critical infrastructure that would increase access to more robust and reliable broadband for use by agencies, businesses, and residents across the state. By improving broadband capacity and reliability, the Project would support economic growth and diversification statewide. As such, the Project would be directly responsive to both the priority guidelines in the Hawai'i State Plan, as well as the various county general and community plans (see Sections 5.3 through 5.6).*

Population Growth and Land Resources

Priority guidelines to effect desired statewide growth and distribution:

(3) Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.

(4) Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.

(6) Seek federal funds and other funding sources outside the State for research, program development, and training to provide future employment opportunities on the neighbor islands.

Discussion: *The Project would be implemented through a public-private partnership which would leverage substantial federal funding to provide critical infrastructure for ensuring robust broadband capacity for the six main Hawaiian Islands. The infrastructure would significantly increase the capacity and reliability of high-speed internet access for agencies, businesses, and residents on each island,*

thereby contributing to economic development and employment opportunities. In particular, enhanced broadband infrastructure would support expansion of businesses and remote work opportunities on the neighbor islands.

Quality Education

Priority guidelines to promote quality education:

(5) Increase and improve the use of information technology in education by the availability of telecommunications equipment for:

(A) The electronic exchange of information.

(B) Statewide electronic mail.

(C) Access to the Internet.

Discussion: *The Project would directly respond to the state plan priority guideline related to quality education by improving access to high-speed broadband and telecommunications, thus promoting access to online educational services and resources, supporting the use of information technology in education, and improving the ability to transmit data for educational purposes.*

Sustainability

Priority guidelines and principles to promote sustainability:

(1) Encouraging balanced economic, social, community, and environmental priorities.

(3) Promoting a diversified and dynamic economy.

(4) Encouraging respect for the host culture.

(5) Promoting decisions based on meeting the needs of the present without compromising the needs of future generations.

Discussion: *The Project would balance economic, social, community, and environmental priorities by providing critical infrastructure to ensure broadband connectivity for agencies, businesses, and residents across the state – connecting people to essential services, supporting economic growth, and maintaining critical government functions – while avoiding and minimizing impacts to the surrounding environment to the extent practicable. As detailed throughout this document, detailed due diligence studies have been conducted to characterize natural and cultural resources within the Project Area; the Project has been designed to avoid and minimize potential impacts, with mitigation measures implemented to ensure any construction-related impacts are less than significant. Once installed, the Project infrastructure is expected to have negligible impacts on natural and cultural resources.*

Climate Change Adaptation

Priority guidelines to prepare the State to address the impacts of climate change:

(5) Encourage the preservation and restoration of natural landscape features, such as coral reefs, beaches and dunes, forests, streams, floodplains, and wetlands, that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change.

(10) Encourage planning and management of the natural and built environments that effectively integrate climate change policy.

Discussion: *As the subsea fiber optic cable must make landfall to facilitate interconnection with each island's existing telecommunications network, it is a shoreline-dependent activity. HDD would be used to install underground conduit beneath the shoreline to accommodate cable installation while avoiding and minimizing impacts to sensitive resources (e.g., beaches, reefs, and coastal dunes) at each cable landing site. As subsea cable systems are specifically designed and built for the marine environment, they are resilient to coastal flooding. Regardless, the Project design incorporates a minimum design standard based on the 1.1-foot sea level rise scenario, as this roughly equates to the current mid-range sea level rise projection for 2050, which generally corresponds to the design life of the subsea cable system. As such, the BMH (and all terrestrial infrastructure extending inland from the BMH) at each cable landfall has been sited outside the 1.1-foot SLR-XA, at a minimum. Where practicable, this infrastructure has been set back further, beyond the 2-foot and/or 3.2-foot SLR-XA. In all cases, the BMH and other terrestrial infrastructure has been sited inland of the maximum projected coastal erosion boundary, where mapped. The infrastructure would be monitored on a regular basis over the life of the Project, including inspections following severe storms, to identify potential impacts of coastal flooding and erosion. Although unlikely to be required, potential erosion could be mitigated using imported fill to stabilize buried infrastructure and/or by re-burying the facilities at a lower elevation to maintain ground clearance; chronic BMH inundation could be addressed through installation of a riser. As the Project has been sited to avoid sensitive landscape features, with a design that is resilient and responsive to climate change policy, and would monitor and mitigate any potential issues, it would be consistent with the state plan guidelines related to climate change.*

5.2.2 State Environmental Policy (HRS Chapter 344)

HRS Chapter 344 establishes a state policy to encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, and enrich the understanding of ecological systems and natural resources important to the people of Hawai‘i. Consistency with the applicable guidelines identified in HRS Chapter 344 is discussed below.

Land, Water, Mineral, Visual, Air, and Other Natural Resources

Guidelines:

(A) Encourage management practices which conserve and fully utilize all natural resources.

(D) Encourage management practices which conserve and protect watersheds and water sources, forest, and open space areas.

(E) Establish and maintain natural area preserves, wildlife preserves, forest reserves, marine preserves, and unique ecological preserves.

(F) Maintain an integrated system of state land use planning which coordinates the state and county general plans.

Discussion: *The Project would involve installation of a subsea fiber optic cable with landfalls at each of the six main Hawaiian Islands. The subsea cable would be surface laid on the ocean floor, with hand*

placement by divers to minimize installation impacts to sensitive resources in nearshore waters. While some corals would be impacted during installation, it is anticipated that affected corals would recolonize and no permanent loss would occur. In order to provide a connection to all six main Hawaiian Islands, the proposed subsea cable must traverse several protected marine environments, including the Hawaiian Islands Humpback Whale National Marine Sanctuary as well as the Mānele-Hulopoʻe MLCD. The cable, which would have a maximum diameter of 1.1 inches, would be surface laid on the ocean floor and would not be expected to significantly affect any sensitive marine resources within these designated areas. HDD would be used to install the cable beneath shoreline area at each cable landing site, thus avoiding and minimizing impacts to sensitive resources (e.g., beaches, reefs, and coastal dunes) to the extent practicable. The onshore cable landfall infrastructure at each cable landing site, which would be located in previously disturbed areas, has been designed to minimize ground disturbance and maintain open space areas, with most Project infrastructure located below ground. The Project would avoid surface water features and would not impact any water sources or forest habitat. Impacts to natural resources would be avoided and minimized to the extent practicable through implementation of BMPs. Furthermore, the Project would be consistent with relevant state and county plans, as discussed in Sections 5.3 through 5.6 of this Draft EA.

Flora and Fauna

Guidelines:

(A) Protect endangered species of indigenous plants and animals and introduce new plants or animals only upon assurance of negligible ecological hazard.

Discussion: *The onshore portions of the Project would not impact any plant species that are federally or state listed as threatened or endangered. Several federally and state listed wildlife species were either observed or documented, or could potentially occur within or traverse over the Project Area for the various cable landing sites. For example, Hawaiian waterbirds are likely to be present in wetlands near the Kauaʻi and Molokai cable landfalls, and nēnē could potentially occur within the Kauaʻi and Hilo cable landing sites. Portions of the Project Area could also provide potential foraging and roosting habitat for the Hawaiian hoary bat, as well as foraging habitat for pueo. Although the onshore portions of the Project Area do not provide suitable nesting or foraging habitat for listed seabirds, individuals may fly over the Project Area at night during the breeding, nesting, and fledging seasons while transiting between higher elevation breeding colonies and the ocean. Impacts to these species would be avoided through implementation of the measures listed in Section 3.7.3, which are consistent with recommendations provided by USFWS and DOFAW. Specific to the marine environment, HDD activities and cable installation would result in increased turbidity, noise, and vessel traffic, which could affect listed marine species such as sea turtles and marine mammals. However, impacts are expected to be localized, short-term, and minor. With implementation of the BMPs listed in Section 3.6.3, which incorporate agency-specified measures including those required by Pac-SLOPES (USACE 2022), the Project is not expected to substantially affect federally or state listed marine species.*

Parks, Recreation, and Open Space

Guidelines:

(A) Establish, preserve and maintain scenic, historic, cultural, park and recreation areas, including the shorelines, for public recreational, educational, and scientific uses.

(B) Protect the shorelines of the State from encroachment of artificial improvements, structures, and activities.

(C) Promote open space in view of its natural beauty not only as a natural resource but as an ennobling, living environment for its people.

Discussion: *To facilitate landfall of the subsea cable at each of the six main Hawaiian Islands, the Project requires crossing of the shoreline at each island. All of the cable landing sites support public recreational opportunities, including use of onshore, shoreline, and nearshore resources. At all six sites, HDD would be used to install underground conduit beneath the shoreline to accommodate cable installation while avoiding and minimizing impacts to sensitive environmental resources (e.g., beaches, reefs, and coastal dunes) to the extent practicable. Construction of the Project would temporarily displace onshore areas used for public recreation as well as affects local views at each cable landing site. However, access to surrounding recreational areas, including the shoreline and nearshore waters would be maintained throughout construction. Following construction, all cable landfall infrastructure would be located at or below ground and no long-term recreational uses or scenic resources would be affected at any of the cable landfalls. The only new aboveground structures to be installed as part of the Project would be the CLS structures within the developed campus at UH Maui College, Molokai Education Center, and UH Hilo, as well as a new stand-alone emergency generator at KCC. These structures would not affect recreational or open space resources.*

Economic Development

Guidelines:

(A) Encourage industries in Hawai‘i which would be in harmony with our environment.

Discussion: *The Project would provide critical infrastructure to ensure broadband connectivity for agencies, businesses, and residents across the state – connecting people to essential services, supporting economic growth, and maintaining critical government functions – while avoiding and minimizing impacts to the surrounding environment to the extent practicable.*

Citizen Participation

Guidelines:

(B) Provide for expanding citizen participation in the decision-making process so it continually embraces more citizens and more issues.

Discussion: *A variety of community outreach and stakeholder consultation efforts have been conducted over the course of the Project development process to date, as detailed in Section 6. In addition, this Draft EA has been prepared to disclose the potential impacts of the Project; the environmental review process includes opportunities for public review and comment, pursuant to HRS Chapter 343 and HAR*

Section 11-200.1. The discretionary permitting process will also include opportunities for public participation (e.g., public hearings).

5.2.3 State Land Use Law (HRS Chapter 205)

The State of Hawai'i Land Use Law (HRS Chapter 205) established the State Land Use Commission (LUC) and authorizes the LUC to designate all lands across the state into one of four land use districts – urban, rural, agricultural, or conservation – based on the general activities and uses of the land. As summarized in Table 5-1 and shown in Figure 15, the Project spans areas within the state urban, agricultural, and conservation district; in addition to the onshore areas classified as conservation district, submerged lands within state waters are also regulated as part of the conservation district. A discussion of the regulations governing each district and the applicability to the Project follows.

Table 5-1. State Land Use Designations

Cable Landing Site	HDD	BMH	Terrestrial Cable	CLS[1/]
Kaua'i	Conservation (Submerged Lands and Terrestrial), Urban	Urban	Urban, Agriculture	Urban
O'ahu	Conservation (Submerged Lands), Urban	Urban	Urban	N/A
Maui	Conservation (Submerged Lands and Terrestrial), Urban	Conservation	Conservation, Urban	Urban
Molokai	Conservation (Submerged Lands), Urban	Urban	Urban	Urban
Lāna'i	Conservation (Submerged Lands and Terrestrial)	Conservation	Conservation	N/A
Hawai'i Island	Conservation (Submerged Lands), Urban	Urban	Urban	Urban

1/ As the CLS on O'ahu and Lāna'i would only involve placement of equipment within an existing building, these locations are not addressed.

5.2.3.1 Urban Land Use District

HRS Chapter 205-2(b) specifies that urban districts shall include activities or uses as provided by ordinances or regulations of the county within which the urban district is situated. As listed in Table 5-1Table 5-1, much of the Project's onshore infrastructure would be located within the state urban district, including all of the CLS facilities and a subset of the BMHs and terrestrial conduit. Pursuant to HRS Chapter 205-2(b), these Project components would be permitted subject to zoning approval by the county. Applicable zoning requirements for the various counties are discussed in Sections 5.3 through 5.6.

5.2.3.2 Agricultural Land Use District

Pursuant to HRS Chapter 205-2, agricultural districts include a range of areas from lands with high capacity for intensive cultivation to lands that are not used for, or that are not suited to, agricultural and ancillary activities by reason of topography, soils, and other related characteristics. HRS Chapter 205-2(d) describes activities that are permitted outright within the agricultural district. HRS Chapter 205-4.5(a) provides further detail regarding permitted uses, based on the Land Study Bureau (LSB) classification system. The LSB system rates the productivity of soils throughout the state based on characteristics including texture, slope, salinity, erodibility, and rainfall, and designates areas in

categories ranging from A to E (with Class A representing the most productive soils and Class E representing the least productive soils). Areas in the agricultural district that are classified as LSB Class B and C are restricted to those uses listed in HRS Chapter 205-4.5(a).

The only Project component in the state agricultural land use district is a subset of the terrestrial cable for the Kauaʻi cable landing site, which would be installed in underground conduit within Kauaʻi Beach Road as well as a portion of Kauaʻi Beach Drive; this area is classified as LSB Class B and C lands, with a small inclusion of LSB Class E lands. Pursuant to HRS Chapter 205-4.5(a)(7), permitted uses on these lands include "public, private, and quasi-public utility lines and roadways, transformer stations, communications equipment buildings, solid waste transfer stations, major water storage tanks, and appurtenant small buildings…" As such, it is anticipated that the terrestrial conduit for the fiber optic cable within Kauaʻi Beach Road and Kauaʻi Beach Drive is a permitted use in the state agricultural land use district.

5.2.3.3 Conservation Land Use District

Pursuant to HRS Chapter 205-2(e), conservation districts include areas necessary for protecting watersheds and water sources; preserving scenic and historic areas; providing park lands, wilderness, and beach reserves; conserving indigenous or endemic plants, fish, and wildlife, preventing floods and soil erosion; forestry; open space; areas of value for recreational purposes; and other permitted uses not detrimental to a multiple use conservation concept. HRS Chapter 205-5 specifies that conservation districts shall be governed by DLNR pursuant to HRS Chapter 183C. More specifically, uses in the conservation district are regulated by the DLNR Office of Conservation and Coastal Lands (OCCL) under HAR Title 13, Chapter 5. Additional information regarding the Project's consistency with land uses allowed in the conservation district is provided in Section 5.2.5.

5.2.4 Coastal Zone Management Program (HRS Chapter 205A)

Enacted as HRS Chapter 205A, the Hawaiʻi CZM Program was promulgated in 1977 in response to the CZMA. The purpose of Hawaiʻi's CZM Program is to provide for the effective management, beneficial use, protection, and development of the coastal zone. Pursuant to HRS Chapter 205A-1, the CZM area is defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the state's police power and management authority, including the U.S. territorial sea." The Hawaiʻi CZM Program is administered by OPSD with the objective of managing development within coastal areas to protect coastal resources.

Key components of the program include (1) regulation of development within the SMA, a designated area extending inland from the shoreline, (2) a shoreline setback area, which serves as a buffer against coastal hazards and erosion and protects view planes; and (3) a federal consistency provision, which requires that federal activities, permits, and financial assistance be consistent with the Hawaiʻi CZM Program. Regulation of development within the SMA and the shoreline setback area are delegated to the various counties; compliance with the SMA and shoreline setback requirements for each cable landing site is further discussed in Sections 5.3 through 5.6. The federal consistency provision was previously discussed in Section 5.1.6 as part of the CZMA.

Objectives, policies, and guidelines for the CZM Program are set forth in HRS Chapter 205A-2 and Chapter 205A-26. The Project's compliance with the applicable objectives, policies, and guidelines is discussed below.

5.2.4.1 Objectives and Policies

Hawai'i's CZM Program focuses on ten objectives—recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, beach protection, and marine resources. Consistency of the Project with each objective and its associated policies is detailed below.

Recreational Resources

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:

- Improve coordination and funding of coastal recreational planning and management; and
- Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:
    - Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;
    - Requiring restoration of coastal resources that have significant recreational and ecosystem value, including but not limited to coral reefs, surfing sites, fishponds, sand beaches, and coastal dunes, when these resources will be unavoidably damaged by development; or requiring monetary compensation to the State for recreation when restoration is not feasible or desirable;
    - Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;
    - Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;
    - Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;
    - Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;
    - Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and
    - Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting that dedication against the requirements of section 46-6.

Discussion: *The Project would involve installation of a subsea fiber optic cable with landfalls at each of the six main Hawaiian Islands, thus requiring crossing of the shoreline and nearshore waters on each island. All of the cable landing sites support public recreational opportunities, including use of onshore, shoreline, and nearshore resources. At all six sites, HDD would be used to install underground conduit beneath the shoreline to accommodate cable installation while avoiding and minimizing impacts to sensitive environmental resources (e.g., beaches, reefs, and coastal dunes) to the extent practicable. Due diligence studies of benthic marine resources were conducted and used to inform siting of the HDD punchout points and associated cable routes to avoid areas known to support corals to the extent practicable. Where it is not possible for the cable route to entirely avoid areas with coral, the cable would be hand-placed by divers to minimize impacts to the extent practicable. The Project is not expected to result in the permanent loss of any corals; as evidenced by subsea cable systems in other similar locations, it is expected that any affected corals would recolonize (including the cable itself). While the anticipated impacts are not expected to be significant, the Project would incorporate efforts to provide benefits related to the coastal environment within or near the Project Area as a means to offset the effects of the cable installation. This effort would be coordinated with the resource agencies, with input from the community as appropriate, through the permitting process.*

During construction, approximately one acre of onshore area would be used for equipment staging and construction activities at each cable landing site. This area would be cordoned off for public safety purposes; however, surrounding areas including the shoreline would continue to be accessible to the public. Similarly, during HDD and cable laying activities, ocean waters would remain open to activities such as boating, surfing, diving, and swimming throughout Project construction, with monitoring and buffer areas around active work areas to maintain public safety. A robust set of BMPs and other measures would be implemented to avoid and minimize potential construction-related impacts to the surrounding environment. Once installed, all cable landfall infrastructure would be located at or beneath the ground surface, and would not have any bearing on shoreline access or coastal recreational opportunities. The only above ground facilities would be CLS facilities on Kauaʻi, Maui, Molokai, and Hawaiʻi Island, all of which would be contained within UH-owned properties not located immediately along the shoreline. For these reasons, it is expected that the Project would be consistent with CZM objective and policies related to providing coastal recreational opportunities to the public.

Historic Resources

Objective: Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

- Identify and analyze significant archaeological resources;
- Maximize information retention through preservation of remains and artifacts or salvage operations; and
- Support state goals for protection, restoration, interpretation, and display of historic resources.

Discussion: *An LRFI was conducted to assist with identification and documentation of historic properties within the Project Area. This included archival research to construct a history of land use and to determine if historic properties have been previously recorded in or near the Project Area, as well as a 100 percent pedestrian inspection to identify any potential historic properties within the Project Area. A total of five historic properties were previously identified within the Project Area, and an additional 11 potential historic properties were identified as part of the LRFI pedestrian survey (see Section 3.8).*

Pursuant to HRS Chapter 6E, consultation with SHPD was initiated with SHPD on June 23, 2025. As the Project requires federal authorization, it is also subject to compliance with NHPA Section 106. A consultation letter was sent to more than 230 NHOs and other entities and individuals that may wish to be involved in the NHPA Section 106 consultation process on September 22, 2025; a consultation letter was subsequently sent to the SHPO on September 24, 2025. These letters included a summary of the LRFI and sought input on historic properties within the APE and the nature of any potential effects of the Project. As detailed in the LRFI and described in the HRS Chapter 6E and NHPA Section 106 consultation letters, an AIS with subsurface testing was recommended to fully identify and document all potential historic properties and provide significance assessments and recommendations in accordance with federal and state requirements. In a letter dated October 23, 2025, the SHPO responded with a request for an AIS to fully identify and inventory all historic properties within the Project Area, and to provide significance assessments and mitigation recommendations for identified historic properties. Consultation specific to the AIS was requested to confirm the appropriate form of AIS documentation. To this end, an AIS subsurface testing strategy was developed and provided to OHA and cultural descendants associated with each cable landing site for input, and was subsequently submitted to SHPD/SHPO for review on November 25, 2025. HRS Chapter 6E and NHPA Section 106 consultation is ongoing and will be completed as part of the permitting and entitlement process, prior to commencement of the Project. Based on the effect determination, any mitigation requirements would be determined in consultation with SHPD/SHPO and other consulting parties; all mitigation measures identified through this process would be implemented as part of the Project. As the Project would fully comply with all applicable federal and state historic preservation requirements and would implement any mitigation measures identified through the consultation process, it would be consistent with the CZM objective and policies related to protection of historic resources.

Scenic and Open Space Resources

Objective: Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

- Identify valued scenic resources in the coastal zone management area;
- Ensure that new developments are compatible with their visual environment by designing and locating those developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
- Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and
- Encourage those developments that are not coastal dependent to locate in inland areas.

Discussion: *As the proposed subsea fiber optic cable would need to make landfall to facilitate delivery of broadband to the various islands within the State of Hawai'i, the Project is a shoreline-dependent activity. Short-term visual effects would occur during Project construction as a result of the presence of equipment and crews at each cable landing site, but these would not significantly impact public views toward the ocean or along the shoreline. Following construction, temporarily disturbed areas would be returned to pre-existing conditions. All Project components associated with the cable landfalls would be located entirely underground; visual evidence of the cable landfall infrastructure would be limited to at-grade BMH manhole covers. The only new aboveground structures to be installed as part of the Project would be the CLS structures within the developed campus at UH Maui College, Molokai Education Center, and UH Hilo, as well as a new stand-alone emergency generator at KCC. As previously described, the CLS facilities at UH Maui College would be visible from Wahinepio Avenue and nearby campus buildings; the CLS at Molokai Education Center would be visible from portions of Duke Maliu Regional Park, Kamehameha V Highway, and residences to the southwest beyond the highway. The Project components at UH Hilo and KCC would not be visible beyond the campus boundaries. The new CLS structures would be installed entirely on UH properties, and would be designed to match the form, color, and texture of surrounding campus building; they would not extend above any existing structures and would not block or obstruct views from surrounding areas. As such, the Project would not diminish the quality of coastal scenic and open space resources and thus would be consistent with the CZM objective and policies related to scenic and open space resources.*

Coastal Ecosystems

Objective: Protect valuable coastal ecosystems, including reefs, beaches, and coastal dunes, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

- Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
- Improve the technical basis for natural resource management;
- Preserve valuable coastal ecosystems of significant biological or economic importance, including reefs, beaches, and dunes;
- Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
- Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Discussion: *As previously described, HDD would be used to install underground conduit beneath the shoreline to accommodate cable installation while avoiding and minimizing impacts to sensitive environmental resources (e.g., beaches, reefs, and coastal dunes) at each cable site. Due diligence studies of benthic marine resources were conducted and used to inform siting of the HDD punchout*

points and associated cable routes to avoid areas known to support corals to the extent practicable. Where it is not possible for the cable route to entirely avoid areas with coral, the cable would be hand-placed by divers to minimize potential construction-related impacts. The Project is not expected to result in the permanent loss of any corals; as evidenced by subsea cable systems in other similar locations, it is expected that any affected corals would recolonize (including the cable itself). While the anticipated impacts are not expected to be significant, the Project would incorporate efforts to benefit coral habitat in select areas near the Project Area as a means to offset the effects of cable installation; this effort would be coordinated with the resource agencies, with input from the community as appropriate, through the permitting process.

HDD requires use of a drilling fluid to facilitate passage of the drill bit through the substratum and carry cuttings back out of the borehole. While the products used in drilling fluid (e.g., bentonite) are naturally occurring, non-toxic, and meet NSF International and ANSI standards for drinking water, the fine particles could impact water quality or otherwise affect aquatic organisms if large quantities were to be released. Although occurrences are rare, the potential for accidental release of drilling fluid during HDD operations would be actively managed through implementation of an IDFR Contingency Plan.

Onshore construction activities (e.g., ground disturbance, material stockpiling) would occur well above the high tide line, such that there would be no direct impact to the marine environment. Indirect impacts to marine water quality could result if sediment or other pollutants associated with construction were to be conveyed through stormwater runoff. However, the extent of ground disturbance has been minimized to the extent practicable and BMPs would be implemented to further avoid and minimize potential impacts to water quality. Specific measures would be identified as part of a SWPPP and site-specific erosion control plans, which would be developed and implemented in accordance with applicable federal, state, and local regulatory requirements. As the Project has been well sited and would incorporate a wide range of measures to further avoid and minimize impacts to marine and coastal resources, it would be consistent with the CZM objective and policies related to protection of coastal ecosystems.

Economic Uses

Objective: Provide public or private facilities and improvements important to the state's economy in suitable locations.

Policies:

- Concentrate coastal dependent development in appropriate areas;
- Ensure that coastal dependent development and coastal related development are located, designed, and constructed to minimize exposure to coastal hazards and adverse social, visual, and environmental impacts in the coastal zone management area; and
- Direct the location and expansion of coastal development to areas designated and used for that development and permit reasonable long-term growth at those areas, and permit coastal development outside of designated areas when:
    - Use of designated locations is not feasible;
    - Adverse environmental effects and risks from coastal hazards are minimized; and

- The development is important to the State's economy.

Discussion: *The State of Hawai'i recognizes broadband as foundational to Hawai'i's economic future and, as importantly, the quality of life of its residents (DBEDT 2020); the importance of this infrastructure is emphasized by the Hawaii State Plan as well as the general and community plans for individual counties across the state (County of Kaua'i 2018; County of Maui 2012; County of Maui 2016; County of Maui 2018; County of Hawaii 2024). The Project would be implemented through a public-private partnership which would leverage federal funding for installation of a subsea fiber optic cable system to distribute broadband to the six main Hawaiian Islands. Fiber optic cable systems are currently the most robust and feasible method for high-speed transmission and distribution of data, and provide an estimated 95 percent of the world's internet communications. Hawai'i's existing infrastructure, which was designed and installed at a time when digital technology was in its infancy, is aging and does not meet the current and projected future bandwidth demands associated with digital streaming and cloud technology. The Project would provide critical broadband infrastructure for use by agencies, businesses, and residents across the state, and would be sufficiently robust to support all manners of telecommunications carrier and enterprise traffic, including high-capacity demand forecasted for healthcare, education, research, public service, commerce, government, and personal uses.*

As the subsea fiber optic cable must make landfall to facilitate interconnection with each island's existing telecommunications network, it is a shoreline-dependent activity. The Project has been designed and would be constructed in a manner that avoids and minimizes impacts to the surrounding environment to the extent practicable, including the use of HDD to install the cable under the shoreline. Once constructed, all cable landfall infrastructure would be located at or below ground and would not affect coastal views; furthermore, the infrastructure would be resilient to coastal hazards (see below for further discussion). The CLS facilities would be located inland, involving use of space in existing buildings or small modular structures on UH-owned properties. As such, the Project would minimize environmental effects and risks from coastal hazards, while providing infrastructure that is critical to the state's economy, consistent with the CZM objective and policies related to economic uses.

Coastal Hazards

Objective: Reduce hazard to life and property from coastal hazards.

Policies:

- Develop and communicate adequate information about the risks of coastal hazards;
- Control development, including planning and zoning control, in areas subject to coastal hazards;
- Ensure that developments comply with requirements of the National Flood Insurance Program; and
- Prevent coastal flooding from inland projects.

Discussion: *Given the shoreline-dependent nature of subsea fiber optic cable systems, the Project would require installation of cable landfall infrastructure within the coastal flood hazard zone and tsunami evacuation zone on each island. Several of the cable landing sites, particularly O'ahu and Molokai, also include 100-year floodplain extending inland from the coastal flood hazard zone, thus necessitating*

additional infrastructure within the flood hazard zone to accommodate the cable landfall. While it is not possible for the Project to avoid placement of infrastructure within these hazard zones, all of the cable landfall infrastructure would be installed underground; furthermore, this infrastructure is specifically designed and built for the marine environment, such that it is able to withstand inundation, should such conditions occur.

In the case of the Molokai cable landing site, much of Kaunakakai town falls within the 100-year floodplain and tsunami evacuation zone, including the Molokai Education Center. Similarly, UH Maui College also falls within the tsunami evacuation zone. As the CLS facilities for these islands have been sited to be located on these UH-owned properties, they would also fall within these hazard zones. These structures would be designed in accordance with the applicable regulations for buildings within the Tsunami Design Zone; the Molokai CLS would also comply with the NFIP and county requirements for the flood zone (with a flood development permit obtained from Maui County Department of Public Works, Engineering Division, as needed). As the Project would be designed and built to withstand any potential inundation and would comply with all applicable regulations, it is expected to be resilient to potential hazards over its design life, in compliance with the CZM objective and policies related to coastal hazards.

Managing Development

Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:

- Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;
- Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and
- Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Discussion: *The HRS Chapter 343 environmental review process to date has included early consultation with agencies, elected officials, community members, and other stakeholders that may be affected by the Project; these efforts are summarized in Section 6. This Draft EA, which includes a detailed discussion of potential impacts, will be made available for public review and comment. Following the environmental review process, discretionary permits to be obtained for the Project will also provide opportunities for public input through public hearings. These efforts will be coordinated as appropriate to address any overlapping or conflicting requirements. Collectively, these efforts would help ensure that the Project provides adequate opportunities for public participation and is developed in accordance with all applicable laws, consistent with the CZM objective and policies related to managing development.*

Public Participation

Objective: Stimulate public awareness, education, and participation in coastal management.

Policies:

- Promote public involvement in coastal zone management processes;
- Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and
- Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Discussion: *As detailed in Section 6, a variety of community outreach and stakeholder consultation efforts have been conducted over the course of the Project development process to date. In addition, this Draft EA has been prepared to disclose the potential impacts of the Project; the environmental review process includes opportunities for public review and comment, pursuant to HRS Chapter 343 and HAR Section 11-200.1. The discretionary permitting process will also include opportunities for public participation (e.g., public hearings). As such, the Project is consistent with the CZM objective and policies related to public participation.*

Beach Protection

Objective: Protect beaches and coastal dunes for public use and recreation, the benefit of coastal ecosystems, and use as natural buffers against coastal hazards; and coordinate and fund beach management and protection.

Policies:

- Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;
- Prohibit construction of private shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities;
- Minimize the construction of public shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities;
- Minimize grading of and damage to coastal dunes;
- Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor; and
- Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor.

Discussion: *The Project has been sited and designed to avoid impacts to the shoreline, beach, and coastal dunes at the various cable landing sites. The BMH and CLS for each site would be located inland of the shoreline setback, with HDD used to install conduit at a depth ranging between approximately 35 to 85 feet under the shoreline (varies by site) to accommodate cable landfall without impacting any beach, coastal dunes, or shoreline areas. The Project would not involve any shoreline hardening structures. As such, the Project is consistent with the CZM objective and policies related to beach protection.*

Marine Resources

Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

- Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
- Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;
- Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;
- Promote research, study, and understanding of ocean and coastal processes, impacts of climate change and sea level rise, marine life, and other ocean resources to acquire and inventory information necessary to understand how coastal development activities relate to and impact ocean and coastal resources; and
- Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Discussion: *As previously described, the Project incorporates the use of HDD (along with implementation of an IDFR Contingency Plan) to avoid and minimize impacts to the shoreline and other sensitive coastal resources to the extent practicable. The locations of the HDD punchout points and cable route were identified and refined based on a variety of due diligence studies, including dive surveys to identify and map marine benthic habitat. Where it is not possible for the cable route to entirely avoid sensitive resources, specific installation methodologies (e.g., hand placement by divers) would be used to minimize impacts to the extent practicable. Furthermore, a range of BMPs and other measures, including those specified by the resource agencies, would be implemented during construction to protect marine wildlife and other sensitive resources (see Section 3.6.2). Once installed, it is anticipated that a majority of the cable would self-bury in areas of soft substrate and segments that traverse hard bottom potentially colonized by coral, with little to no impacts to marine resources resulting from cable operation. The cable would be operated over its 25-30 year design life (or longer, based on operational value) to provide critical broadband capacity, which is foundational to both economic growth and quality of life for Hawaii's residents. Once determined to no longer have commercial value, the cable would be evaluated for other continued uses, such as scientific research, climate and ocean observation, or maritime security monitoring. As the Project would incorporate multiple layers of impact avoidance*

and minimization to marine and coastal resources, while also providing significant economic and social benefits, it would be consistent with the CZM objective and policies related to marine resources.

5.2.4.2 Guidelines

HRS Chapter 205A-26 establishes guidelines to be used by the applicable regulatory authority for review of developments proposed in the SMA. Following is a discussion of the Project's compliance with each of these guidelines.

HRS Chapter 205A-26(1) specifies that all development in the SMA shall be subject to reasonable terms and conditions set by the authority in order to ensure:

(A) Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas, and natural reserves is provided to the extent consistent with sound conservation principles.

Discussion: *The Project would require temporary use of onshore areas used for recreation during construction at each cable landing site; these areas would be cordoned off to ensure public safety but access to the shoreline and nearshore waters would not be restricted. Similarly, a buffer zone would be maintained around active work areas in the nearshore waters during HDD and cable laying activities; all surrounding ocean waters would remain open to activities such as boating, surfing, diving, and swimming throughout Project construction. Once constructed, all infrastructure within the SMA would be located at or below ground and would have no bearing on public access.*

(B) Adequate and properly located public recreation areas and wildlife preserves are reserved.

Discussion: *As discussed above, construction of the Project would temporarily displace areas used for public recreation at each cable landing site; however, access to surrounding recreational areas, including the shoreline and nearshore waters would be maintained throughout construction. Following construction, all cable landfall infrastructure would be located at or below ground and no long-term recreational uses would be affected at any of the cable landing sites.*

(C) Provisions are made for solid and liquid waste treatment, disposition, and management that will minimize adverse effects upon special management area resources.

Discussion: *Construction of the Project is not anticipated to generate a significant amount of solid waste. During construction, all waste would be temporarily stored onsite and periodically transported and properly disposed of in a permitted landfill, with green waste and recycling diverted to available facilities to the extent practicable. Drilling fluid returns generated by HDD activities would be contained in an onsite slurry separation system where clean drilling fluid would be separated and reused for drilling. The clean soil by-product would be stockpiled for use or disposed of at an off-site facility along with any slurry that cannot be reused. Although occurrences are rare, the potential for accidental release of drilling fluid during HDD operations would be actively managed through implementation of an IDFR Contingency Plan. Once constructed, the Project would not generate any waste.*

(D) Alterations to existing landforms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, wind damage, storm surge, landslides, erosion, siltation, or failure in the event of earthquake.

Discussion: *The Project has been sited and designed to avoid all onshore surface water features. The subsea cable would require work in marine waters, but the cable would be surface-laid on the ocean floor with HDD used to install the cable under the shoreline to avoid and minimize impacts to sensitive habitats to the extent practicable. Furthermore, a robust set of BMPs would be implemented to minimize potential impacts to water quality, sensitive species, and other marine resources (see Sections 3.5.2, 3.6.2, and 3.7.2). Once installed, all Project infrastructure within the SMA would be located underground, such that there would be no impact on either scenic or recreational amenities. The underground infrastructure would also be resilient to flooding, erosion, and other natural disasters.*

HRS Chapter 205A-26(2) specifies that no development shall be approved unless the authority has first found:

(A) That the development will not have any significant adverse environmental or ecological effect, except as any adverse effect is minimized to the extent practicable and clearly outweighed by public health, safety, or compelling public interests. Those adverse effects shall include but not be limited to the potential cumulative impact of individual developments, each of which taken by itself might not have a significant adverse effect, and the elimination of planning options.

Discussion: The Project is not expected to result in any substantial adverse environmental or ecological effects, including potential cumulative impacts, as detailed throughout Section 3 and summarized in Section 7. Furthermore, it would provide access to high-capacity and robust broadband connectivity, thus supporting the economic and social wellbeing across the state.

(B) That the development is consistent with the objectives, policies, and special management area guidelines of this chapter and any guidelines enacted by the legislature.

Discussion: *As detailed in Section 5.2.4.1, the Project is expected to be consistent with the objectives and policies set forth in HRS Chapter 205A-2.*

(C) That the development is consistent with the county general plan, community plan, and zoning; provided that a finding of consistency shall not preclude concurrent processing where a general plan, community plan, or zoning amendment may also be required.

Discussion: *The Project is expected to be consistent with the applicable general plans, community plans, and zoning ordinances for each cable landing site, as discussed in Sections 5.3 through 5.6.*

HRS Chapter 205A-26(3) specifies that the regulatory authority shall seek to minimize, where reasonable:

(A) Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon.

Discussion: *The Project has been sited to avoid alterations to onshore surface water features, and would not involve dredging or filling. The cable, with a maximum diameter of approximately 1.1 inches, would have a minimal footprint and would be surface laid on the ocean floor.*

(B) Any development that would reduce the size of any beach or other area usable for public recreation.

Discussion: *During construction, a portion of the onshore Project Area would be used for equipment staging and construction activities at each cable landing site. This area would be cordoned off for public safety purposes; however, surrounding areas including the beach and shoreline would continue to be accessible to the public. Similarly, during HDD and cable laying activities, ocean waters would remain open to activities such as boating, surfing, diving, and swimming throughout Project construction, with monitoring and buffer zones around active work areas to maintain public safety. Once installed, all cable landfall infrastructure would be located at or beneath the ground surface, and would not have any bearing on beach/shoreline access or coastal recreational use.*

(C) Any development that would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management areas and the mean high tide line where there is no beach.

Discussion: *As discussed above, Project construction would require use of onshore areas for equipment staging and construction activities at each cable landing site. This area would be cordoned off for public safety purposes; however, surrounding areas including the beach shoreline would continue to be accessible to the public. Similarly, during HDD and cable laying activities, ocean waters would remain open for recreational activities throughout Project construction, with monitoring and buffer zones around active work areas to maintain public safety. Once constructed, all cable landfall infrastructure would be located at or beneath the ground surface and would not affect public access or recreational opportunities.*

(D) Any development that would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast.

Discussion: *The Project would result in short-term visual effects during Project construction as a result of the presence of equipment, vessels, and crews at each cable landing site and along the cable route, but these would not significantly impact public views toward the ocean or along the shoreline. Following construction, all temporarily disturbed areas would be returned to pre-existing conditions. All Project components associated with the cable landfalls would be located entirely underground; visual evidence of the cable landfall infrastructure would be limited to at-grade BMH manhole covers. Aboveground structures associated with the new CLS structures would not be in the line of sight of coastal views. As such, once constructed, the Project would not interfere with or detract from the line of sight from coastal state highways toward the ocean.*

(E) Any development that would adversely affect water quality, existing areas of open water free of visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.

Discussion: *The Project would involve installation of a subsea cable that is surface laid on the ocean floor, with cable landfall infrastructure at a cable landing site on each of the six main Hawaiian Islands. Through detailed studies and an iterative siting and design process, the cable has been routed primarily through areas of soft bottom substrate with low biological complexity. HDD would be used to install underground conduit between the onshore area for the cable landfall and an associated offshore punchout point to avoid and minimize impacts to sensitive shoreline and nearshore marine resources to the extent practicable. Furthermore, a robust set of BMPs would be implemented, such that Project construction is not expected to significantly impact water quality, sensitive marine species, or fisheries.*

Once installed, the cable is expected to rapidly self-bury in areas of soft substrate; corals would likely colonize cable segments that traverse hard bottom. The Project would not affect agricultural uses.

5.2.5 Conservation District (HRS Chapter 183C)

Pursuant to HRS Chapter 183C, the purpose of the conservation district is to conserve, protect, and preserve the important natural resources of the state through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. Use of the state conservation district is regulated and managed by OCCL and the Board of Land and Natural Resources (BLNR). In addition to designated areas on each island, the conservation district includes all submerged lands in the state from the shoreline seaward to the extent of Hawai‘i’s jurisdiction (HAR Section 13-5). Based on the implementing rules set forth in HAR Chapter 13-5, the conservation district is classified into five subzones: protective, limited, resource, general, and special. The Project would include use of submerged lands for the HDD and subsea cable. Other portions of the Project in the conservation district include onshore infrastructure at the Nukoli‘i Beach Park (Kaua‘i), Kahului Harbor Breakwater (Maui), and Mānele Harbor (Lāna‘i) cable landing sites (see Table 5-1). These areas fall within the protective, limited, and resource subzones of the conservation district.

HAR 13-5-22 identifies those land uses which may be permitted within the protective subzone (and HAR 13-5-23 through 25 further permits these same land uses in the other subzones). Based on a letter received from OCCL in response to the pre-assessment scoping letter for this EA, it is understood that the Project would be an identified land use pursuant to HAR Section 13-5-22 (P-6, Public Purpose Use). This land use is permitted with the issuance of a Conservation District Use Permit, which requires a public hearing and approval by BLNR. The evaluation criteria provided in HAR 13-5-30(c) are listed below, along with a discussion of the Project’s consistency with each criterion.

Criterion 1: The proposed land use is consistent with the purpose of the conservation district.

Discussion: *The purpose of the conservation district is to conserve, protect, and preserve the important natural and cultural resources of the state through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. Project infrastructure within the conservation district would include the portions of the subsea fiber optic cable within state waters (i.e. within three nautical miles of the shoreline), and portions of the terrestrial infrastructure at the Nukoli‘i Beach Park (Kaua‘i), Kahului Harbor Breakwater (Maui), and Mānele Harbor (Lāna‘i) cable landing sites (see Figure 15). As stated above, it is understood that the Project would be an identified land use pursuant to HAR Section 13-5-22 (P-6, Public Purpose Use), which is permitted with the issuance of a Conservation District Use Permit.*

A variety of existing and Project-specific data were used to inform the selection of cable landing sites and the associated cable route; due diligence studies were conducted to further inform the siting process and refine the design, thereby avoiding and minimizing impacts to natural and cultural resources to the extent practicable. Furthermore, a robust set of BMPs and other measures would be implemented to further reduce potential environmental impacts. As detailed throughout this document, it is expected that Project-related impacts would generally comprise short-term, minor impacts during construction.

HDD would be used to install the cable deep beneath shoreline area at each cable landing site, thus avoiding and minimizing impacts to sensitive resources (e.g., beaches, reefs, and coastal dunes) to the extent practicable. The subsea cable would be surface laid on the ocean floor, with hand placement by divers to minimize installation impacts to sensitive resources in nearshore waters. While some corals would be impacted during installation, no permanent coral loss would occur. As evidenced by subsea cable systems in other similar locations, it is expected that the cable would self-bury in areas of soft substrate; any segments that traverse hard bottom could be colonized by corals. Once installed, the cable landing infrastructure on each island would be located at or below ground level, resulting in negligible impacts over the long term.

As the Project would provide critical infrastructure that is needed to support long-term economic growth and wellbeing of Hawai'i's residents and would be constructed in a manner that avoids and minimizes environmental impacts to the extent practicable, the Project would be consistent with the purpose of the conservation district.

Criterion 2: The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur.

Discussion: *The Project infrastructure would be located within the protective, limited, and resource subzones. The objective of the protective subzone is to protect valuable natural and cultural resources. The objective of the limited subzone is to limit uses where natural conditions suggest constraints on human activities. The objective of the resource subzone is to ensure, with proper management, the sustainable use of natural resources. As described above, it is understood that the Project would be considered a Public Purpose Use (per HAR Section 13-5-22(b), P-6), which is an identified land use in the protective subzone. Per HAR Section 13-5-23(a) and HAR Section 13-5-24(a), any identified land use in the protective subzone also applies to the limited and resource subzones (respectively).*

As described above for Criterion 1, the Project would provide critical infrastructure to meet current and future projected telecommunication needs for agencies, businesses, and residents across the state, while avoiding and minimizing impacts to natural and cultural resources to the extent practicable. Project-related impacts are expected to be short-term and minor; no measurable impacts to natural or cultural resources are anticipated over the long-term, as further discussed in response to Criterion 4. As such, the Project is expected to be consistent with the subzone objectives.

Criterion 3: The proposed land use complies with provisions and guidelines contained in Chapter 205A, HRS, entitled "Coastal Zone Management," where applicable.

Discussion: *The Project would be consistent with the objectives, policies, and guidelines specified in HRS Chapter 205A, as detailed in Section 5.2.4.*

Criterion 4: The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.

Discussion: *The Project is not expected to result in any substantial adverse environmental or ecological effects, as detailed throughout Section 3 and summarized in Section 7. In the marine environment, a variety of existing and Project-specific data were used to inform cable route selection and avoid and minimize impacts to marine biological resources to the extent practicable; specifically*

within nearshore waters, dive surveys were conducted to identify the marine benthic habitats, fish communities, and invertebrate assemblages, with the results used to inform detailed routing and micrositing (see Section 3.6). The Project incorporates the use of HDD (along with implementation of an IDFR Contingency Plan) to avoid and minimize impacts to the shoreline and other sensitive coastal resources at each cable landing site to the extent practicable. Where it is not possible for the cable route to entirely avoid areas with coral, the cable would be hand-placed by divers to minimize potential construction-related impacts. The Project is not expected to result in the permanent loss of any corals; as evidenced by subsea cable systems in other similar locations, it is expected that any impacted corals would recolonize (including the cable itself). For the onshore components of the Project Area, surveys of terrestrial biological resources were conducted to characterize the species and habitats present, and to determine whether federally or state listed threatened or endangered species have the potential to occur. The results of the biological survey indicate that the terrestrial portions of the cable landing sites have been highly modified by previous land uses and the introduction of invasive species, which has resulted in a decreased number and abundance of native species and habitats suitable for native species. With implementation of a robust list of BMPs which incorporate recommended measures identified by federal and state resource agencies, as detailed in Sections 3.6 and 3.7, potential impacts to marine and terrestrial biological resources would be minimal.

Criterion 5: The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.

Discussion: *As described above, Project infrastructure within the conservation district would include the portions of the subsea fiber optic cable within state waters (i.e. within three nautical miles of the shoreline), and portions of the terrestrial cable landfall infrastructure on Kauaʻi, Maui, and Lānaʻi (e.g., onshore portion of HDD conduit and BMH). As described above, the subsea cable would be surface-laid on the ocean floor; a variety of existing and Project-specific data were used to assess bottom substrate types, slopes and bathymetry, and identify potential habitats to select a suitable route that minimizes impacts to hard bottom habitat to the extent practicable. Once installed, as evidenced by subsea cable systems in other similar locations, it is expected that the cable would self-bury in areas of soft substrate; any segments that traverse hard bottom could be colonized by corals. All of the terrestrial cable landfall infrastructure, including the onshore portion of the HDD conduit, BMH, and conduit for the terrestrial cable would be located at or below ground. Geotechnical and other physical surveys have been conducted to verify the physical conditions of each site and to inform proper siting and design of these components. Following construction, all temporarily disturbed areas would be returned to pre-existing conditions. The only visual evidence of the cable landfall infrastructure within the conservation district would be at-grade BMH manhole covers. As the Project infrastructure has been appropriately sited and designed based on site conditions, with all components in the conservation district located at or below ground, the Project is expected to be compatible with the existing land uses within and surrounding the Project Area, consistent with Criterion 5.*

Criterion 6: The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable.

Discussion: *During construction, the Project would require temporary use of recreational and/or open space areas at each cable landing site; those areas within the conservation district include a portion of Nukoli'i Beach Park (Kaua'i), the western breakwater area for Kahului Harbor (Maui), and the southern parking lot at Manele Small Boat Harbor (Lāna'i). Following construction, temporarily disturbed areas would be returned to pre-existing conditions. All Project components associated with each cable landfall would be located at or below ground; visual evidence of the cable landfall infrastructure would be limited to at-grade BMH manhole covers. Within state submerged waters, the subsea cable, with a maximum diameter of approximately 1.1 inches, would have a minimal footprint and would be surface laid on the ocean floor. As such, the Project would not diminish the natural beauty or open space characteristics within the conservation district, consistent with Criterion 6.*

Criterion 7: Subdivision of land will not be used to increase the intensity of land uses in the conservation district.

Discussion: *The Project would not involve the subdivision of land.*

Criterion 8: The proposed land use will not be materially detrimental to the public health, safety and welfare.

Discussion: *Project construction would involve the use of heavy equipment at each cable landing site; all active construction work areas would be cordoned off to ensure public safety while still maintaining access to the shoreline and nearshore waters. Similarly, a buffer would be maintained around active work areas in the nearshore waters during HDD and cable laying activities, with all surrounding ocean waters remaining open for public use throughout Project construction. Once constructed, all Project infrastructure within the conservation district would be located at or below the ground surface and would not present any concerns related to public health, safety, or welfare. The subsea cable would be surface laid on the ocean floor; as evidenced by subsea cable systems in other similar locations, it is expected that the cable would self-bury in areas of soft substrate. Once operational, the subsea fiber optic cable system would provide long-term benefits related to public health, safety, and welfare by providing critical broadband infrastructure to support all manners of telecommunications carrier and enterprise traffic, including high-capacity demand forecasted for healthcare, education, research, public service, commerce, government, and personal uses. As such, the Project is expected to be consistent with the above-listed criterion.*

5.2.6 Hawaiian Homes Commission Act

The Hawaiian Homes Commission Act of 1920, which was enacted before Hawai'i became a state, was intended to enable native Hawaiian to return to their lands in order to fully support self-sufficiency, self-determination, and the preservation of the values, traditions, and culture of native Hawaiian. The Act created a Hawaiian Homes Commission to administer certain public lands for homesteads to be known as Hawaiian home lands. The Act was incorporated as a provision in the state constitution in 1959 when Hawai'i was granted statehood. Responsibility for the Commission and the Hawaiian home lands was transferred to the state at that time. The land trust, which is managed by DHHL, consists of over 200,000 acres on the islands of Hawai'i, Maui, Molokai, Lāna'i, O'ahu, and Kaua'i. In addition to administering the homesteading program for its beneficiaries, DHHL leases trust lands not in homestead use at market value and issues revocable permits, licenses, and rights-of-entry. The

income from these enterprises is used to supplement DHHL's programs, including continued homestead development.

As described in Section 2.4.6, the HDD conduit for the Hawai'i Island cable landing site would traverse under a portion of TMK (3) 2-1-011:005, which is part of the Keaukaha homestead tracts owned by DHHL. As such, the Project requires approval from DHHL for access to and use of this land. In April 2025, an application was submitted to DHHL to obtain a right-of-entry (ROE) for approximately 690 square feet of this parcel to allow for ongoing due diligence studies and pre-development activities for the Project. In accordance with DHHL policy for long-term, non-homestead land uses, beneficiary consultation was conducted as part of the ROE review and approval process. A beneficiary consultation meeting was held on July 8, 2025, at Keaukaha Elementary School, followed by a 30-day comment period. The ROE was granted by DHHL on September 15, 2025. The ROE approval only authorizes planning activities to assess the viability of the Project and does not authorize construction. Approval of a license by DHHL, which would include beneficiary consultation, would be obtained prior to Project construction.

5.3 Kaua'i County

5.3.1 Kaua'i General Plan

The Kaua'i General Plan establishes priorities for managing growth and community development over a 20-year planning timeframe and guides future action concerning land use and development regulations, urban renewal programs, and expenditures for capital improvements (County of Kaua'i 2018). The General Plan includes overarching goals, policies that articulate priorities for growth, and specific objectives organized by sector. Overall, the Project is consistent with the goals of the Kaua'i General Plan, which relate to sustainable growth, protection of natural and cultural sources, community health, and equitable opportunities. The Project would provide robust and reliable broadband infrastructure to ensure high-speed internet access for agencies, businesses, and residents across Kaua'i, thereby contributing to economic growth, improved access to telehealth and online education, and other critical services. Through detailed studies, an iterative siting and design process, and implementation of a robust set of BMPs, the Project would avoid and minimize impacts to sensitive natural and cultural resources. Once constructed, the Project infrastructure would be located entirely underground (with the exception of an emergency generator to support the CLS equipment within the KCC campus), and would not affect any scenic views, public access, or recreational activities. Consistency of the Project with the applicable policies of the Kaua'i General Plan is summarized below.

Policy 1. Manage growth to preserve rural character: Preserve Kaua'i's rural character by limiting the supply of developable land to an amount adequate for future needs. Prohibit development not adjacent to towns. Ensure new development occurs inside growth boundaries and is compact and walkable.

> Discussion: *As shown on the General Plan Land Use Map, the cable landfall and CLS would be located within areas designated as agriculture (outside the urban edge boundary) and university zone (inside the urban edge boundary), respectively. Once constructed, the Project would consist entirely of underground infrastructure, with the exception of an emergency generator to support the*

CLS equipment at KCC. As such, the Project would not contribute to expansion of development, change in land use, or loss of rural character.

Policy 5. Make strategic infrastructure investments: New government investment should support growth areas and include priority projects as identified in Community Plans.

Discussion: *The Project would be implemented through a public-private partnership, which would leverage substantial federal funding, to provide critical infrastructure for ensuring robust broadband capacity for the six main Hawaiian Islands, including Kauaʻi.*

Policy 8. Protect Kauaʻi's scenic beauty: Protect the island's natural beauty by preserving the open space and views between towns.

Discussion: *The Project would result in short-term visual effects as a result of construction activities and the presence of equipment and crews within the Project Area. However, following construction, all Project components would be located underground, with the exception of an emergency generator to support CLS equipment within the KCC campus. Once constructed, the Project would not affect any scenic resources, including open space, landmarks, heritage places, or shoreline views.*

Policy 10. Help business thrive: Create and foster thriving commercial areas in Town Centers through improved infrastructure, civic space, streetscapes, updated zoning standards, and streamlined approval processes.

Discussion: *The Project would provide Kauaʻi with robust middle mile broadband infrastructure, which would significantly increase the capacity and reliability of high-speed internet access. This critical infrastructure would directly benefit business across the islands, including entrepreneurs and small businesses, cottage industries and home-based businesses, as well as high-tech industries. Furthermore, in combination with important last mile infrastructure, it would facilitate access for currently unserved and underserved communities across the island.*

Policy 12. Protect our Watersheds: Act with the understanding that forests, biodiversity, and water resources are fragile and interconnected. Restore and protect our watershed from mauka to makai.

Discussion: *The Project would not occur within a forested watershed area. As the Project involves landfall of a subsea cable, it would require crossing of the shoreline and work in the coastal environment. However, HDD would be used to install underground conduit deep beneath the shoreline to accommodate the cable landing while minimizing impacts to sensitive environmental resources along the shoreline. Due diligence studies of the benthic marine resources were conducted and used to inform siting of the HDD punchout and cable route to avoid locations known to support corals. A robust set of BMPs and other measures would be implemented throughout construction to avoid and minimize impacts to sensitive species that could potentially occur. Once constructed, the subsea cable system would not result in any measurable long-term environmental impacts.*

Policy 14. Prepare for Climate Change: Prepare for impacts to the island economy, food systems and infrastructure that will be caused by climate change.

Discussion: *Subsea cable systems are resilient to coastal flooding as they are specifically designed and built for the marine environment. Regardless, the Project incorporates a minimum design standard based on the 1.1-foot SLR-XA, as this roughly equates to the current mid-range sea level*

rise projection for 2050, which generally corresponds to the design life of the subsea cable system. In the case of the cable landfall at Nukoli'i Beach Park, the HDD conduit would be installed under the shoreline with the BMH located more than 150 feet inland of the projected extent of the 2.0-foot scenario SLR-XA (as well as the maximum projected extent of coastal erosion associated with sea level rise). The infrastructure would be monitored on a regular basis over the life of the Project, including inspections following severe storms, to identify potential impacts of coastal flooding and erosion from large wave events. Although unlikely to be required, potential erosion could be mitigated using imported fill to stabilize buried infrastructure and/or by re-burying the facilities at a lower elevation to maintain ground clearance; chronic BMH inundation could be addressed through installation of a riser. For these reasons, it is expected that the Project would be resilient to sea level rise caused by climate change.

Policy 15. Respect Native Hawaiian Rights and Wahi Pana: Perpetuate traditional Native Hawaiian rights and protect public trust resources and cultural sites in all land use development and activities.

Discussion: *As detailed in Section 3.8, an LRFI was conducted to identify and document historic properties within the Project Area. This effort included archival research, a review of previous archaeological studies, and a pedestrian survey. Two previously identified sites are located within the Project Area at Nukoli'i Beach (a pre-Contact habitation complex with two subsurface cultural deposit features as well as a reinterment area for inadvertently discovered iwi kūpuna identified along the shoreline, and a water control irrigation ditch); two potential historic properties were also identified (a concrete jetty off the shoreline and a water control feature consistency of a metal drainage gate and small drainage ditch). Based on the recommendations contained in the LRFI, and in consultation with SHPD, an AIS with subsurface testing is in process; any resulting mitigation measures identified by SHPD would be implemented as part of the Project.*

In addition, a CIA and Ka Pa'akai Analysis has also been conducted for the Project (see Section 3.9); in addition to archival research, this effort included outreach to an extensive list of organizations, agencies, and community members. Key issues identified through this process relate to shoreline and ocean access for recreation and subsistence activities, construction impacts to marine and other sensitive environmental resources, and the potential occurrence of subsurface cultural resources (including burials). Recommendations to avoid and minimize potential impacts to traditional cultural resources, practices, and beliefs would be implemented as part of the Project, as detailed in Section 3.9.

Policy 16. Protect Access to Kaua'i's Treasured Places: Protect access to and customary use of shoreline areas, trails, and places for religious and cultural observances, fishing, gathering, hunting, and recreational activities, such as hiking and surfing.

Discussion: *The proposed cable landfall would be located at Nukoli'i Beach Park. During construction, a portion of the beach park area would be temporarily used for equipment staging and construction activities. This area would be cordoned off for public safety purposes; however, the remainder of the beach park and all shoreline areas would continue to the accessible to the public. Similarly, during HDD and cable laying activities, ocean waters would remain open to activities such as boating, surfing, diving, and swimming throughout Project construction, with monitoring and buffer zones around active work areas to maintain public safety. Advanced notice of the work would*

be communicated to the public through the appropriate channels. Once installed, all cable landfall infrastructure would be located at or beneath the ground surface, and would have no bearing on public access for recreation, subsistence, or any other uses.

Policy 18. Honor our Kūpuna: Prepare for the aging of Kaua'i's population through housing, services, and facility improvements that meet the needs of elderly households.

Discussion: *By providing more robust broadband infrastructure for the island of Kaua'i, the Project would increase the availability of reliable high-speed internet access which would help to support access to telehealth and other online resources that could be utilized by kūpuna. Together with expanded last mile infrastructure, the Project would also help to ensure broadband connectivity for currently unserved and underserved communities, which is specifically identified for action in the General Plan.*

Policy 19. Communicate with Aloha: Kaua'i's residents care about planning and decision-making. Government must share information, encourage input, improve public processes, and be responsive.

Discussion: *As detailed in Section 6, a variety of community outreach and stakeholder consultation efforts have been conducted over the course of the Project development process to date. In addition, this Draft EA has been prepared to disclose the potential impacts of the Project; the environmental review process includes opportunities for public review and comment, pursuant to HRS Chapter 343 and HAR Section 11-200.1. The discretionary permitting process will also include opportunities for public participation through public hearings.*

5.3.2 Līhu'e Community Plan

The Kaua'i cable landing site is located within the Līhu'e District. The most recent Līhu'e Community Plan was adopted in 2015. Building on the broad direction provided in the General Plan, it sets forth direction and recommended policies for the Līhu'e District over a twenty year time horizon (2015-2035). The plan presents a vision for the Līhu'e District as a place with connected, walkable, and vibrant communities that reflect a unique identity and sense of place, and Līhu'e as the hub for business, government, transportation, and urban activity (County of Kaua'i 2015). The plan specifies policy objectives and guiding principles that articulate the desired qualities for communities in the Līhu'e District, as well as plans for future use and development. Specific policies and guidelines are presented as related to (1) land use; (2) parks, open space and civic spaces; (3) heritage resources; (4) transportation; (5) public facilities and infrastructure; (6) housing; (7) economic development; (8) hazard mitigation; (9) climate change; and (10) community-specific policies. Following is a discussion of the Project's consistency with applicable policies.

Land Use

The Līhu'e Community Plan Land Use Plan identifies the cable landfall at Nukoli'i Beach as Resort (outside the Urban Edge Boundary) and the CLS location at KCC as Urban Center (within the Urban Edge Boundary). It is understood that subsequent to adoption of the Līhu'e Community Plan, the land use designation at Nukoli'i Beach Park was changed to agriculture through the Kaua'i General Plan update process. The Project would involve installation of underground infrastructure for the cable landfall at Nukoli'i Beach Park and would not affect the use or availability of agricultural lands. The CLS at KCC would consist of equipment within an existing building, along with a new stand-alone

emergency generator. As such, the Project would be consistent with these designated land uses in the Līhuʻe Community Plan.

Heritage Resources

Policies:

- Preserve open space buffers between communities to preserve distinct community edges and provide visual indicators of separation.
- Protect riparian areas and stream quality by limiting development, grazing, and other activities that impact water quality.
- Preserve viewsheds and scenic qualities of features including views of Hāʻupu Ridge, Kālepa Ridge, and Kilohana Crater.
- Preserve important archaeological sites and historic sites within the Līhuʻe District as identified in Chapter 3 and on the Heritage Resources Map in the General Plan.

Discussion: *The Project would be consistent with policies related to heritage resources as it would not impact open space buffers between communities, is being developed away from riparian areas and streams, and would not impact viewsheds and scenic qualities identified in the Līhuʻe District.*

Transportation

None of the policies in the Līhuʻe Community Plan related to transportation are applicable to the Project. However, the plan identifies a proposed pedestrian path along Kauaʻi Beach Drive and Kauaʻi Beach Road, as well as along the shoreline. Once constructed, the Project infrastructure in this location would be entirely underground and would not restrict or otherwise impede plans for pedestrian paths in these locations.

Economic Development

Policies:

- Continue to support diversification of Kauaʻi's economy through developing and strengthening key economic clusters and growth industries for Kauaʻi identified in the 2010 Comprehensive Economic Development Strategy (CEDS).

Discussion: *The Project would provide Kauaʻi with robust middle mile broadband infrastructure, which would significantly increase the capacity and reliability of high-speed internet access for businesses and residents across the island. This critical infrastructure would contribute to economic growth by enabling businesses to adopt digital services and reach wider markets, as well as support economic diversification by attracting new industries, enabling remote workers, and enhancing virtual communication and collaboration.*

Climate Change

Policies:

- Avoid or minimize coastal resource impacts when addressing risks to new or existing development
- Require development proposals to include analysis of coastal hazard impacts and include mitigation measures where applicable.

Discussion: *As previously noted, subsea cable systems are resilient to coastal flooding as they are specifically designed and built for the marine environment. Regardless, the Project incorporates a minimum design standard based on the 1.1-foot SLR-XA, as this roughly equates to the current mid-range sea level rise projection for 2050, which generally corresponds to the design life of the subsea cable system. The HDD conduit would be installed under the shoreline at Nukoli'i Beach Park with the BMH located more than 150 feet inland of the projected extent of the 2.0-foot scenario SLR-XA (as well as the maximum projected extent of coastal erosion associated with sea level rise). As described in Section 3.1.2, the infrastructure would be routinely monitored and any potential issues associated with erosion or inundation, although unlikely, would be mitigated as needed.*

5.3.3 Comprehensive Zoning Ordinance

The County of Kaua'i's Comprehensive Zoning Ordinance (CZO; Kaua'i County Code Chapter 8) provides regulations and standards for land development and the construction of buildings and other structures. It establishes specific districts and identifies the respective types of permitted uses and development that can take place in those districts as a means to promote development that is compatible with the surrounding environment and is not detrimental to the social and economic wellbeing of the island's residents. Based on the zoning district established under the CZO, the HDD would traverse areas within the conservation (CON)[34] and open space (O) zoning district and a small amount of underground conduit would extend across the agricultural (A) zoning district; the remainder of the underground conduit would be within existing roadways (which are not within a designated zoning district). The CLS would be within the University District (UNV) (Figure 16.1). Based on the definitions provided in the CZO, it is anticipated that the Project would be considered a "private or public utility facility" which is defined to include structures or sites used for delivery of utility services, such as solid waste, sewer, water, cable, and electricity (e.g., transfer stations, transformers, pump stations, water tanks, and equipment sheds). Pursuant to CZO Chapter 8-2.4(S)(16), Chapter 8-2.4(U)(14), and Chapter 8-2.4(X)(6), public and private utility facilities are permitted within the agriculture, open space, and university districts with issuance of a Use Permit, respectively. It is anticipated that a Class IV Zoning Permit would also be required. These permits would be filed together in a single application and would require a public hearing and approval by the Kaua'i Planning Commission.

[34] The conservation zoning district generally corresponds to the state conservation land use district, within which land use is regulated by the state (see Section 5.2.5). As such, this area is not expected to be subject to county jurisdiction.

5.3.4 Special Management Area

As authorized by HRS Chapter 205A, the County of Kauaʻi regulates all land uses within the SMA for the purpose of protecting valuable resources and ensuring adequate public access is maintained to beaches, recreation areas, and other similar areas. Regulation within the SMA is governed by the Special Management Area Rules and Regulations of the County of Kauaʻi. As the cable landfall infrastructure would be located within the SMA (see Figure 16.1) and would be valued at greater than $500,000, an SMA Use Permit would be required. SMA Use Permits require approval by the Kauaʻi Planning Commission. Section 4 of the County's SMA Rules establish specific guidelines for review and approval of development in the SMA; these mirror the objectives, policies, and guidelines contained in HRS Section 205A-2 and 205A-26; consistency with these objectives, policies, and guidelines is addressed in Section 5.2.4.

5.3.5 Shoreline Setback

Pursuant to HRS Chapter 205A-43, the County of Kauaʻi has established minimum shoreline setback requirements to protect life and property, provide access to and along the shoreline, protect and preserve Native Hawaiian cultural resources and communities threatened by sea level rise, ensure the longevity and integrity of coastal and beach resources along the shoreline. As detailed in CZO Chapter 8-27.3, a shoreline setback determination is required to establish the shoreline setback line. For lots included in the Kauaʻi Coastal Erosion Study with an average lot depth greater than 220 feet, such as the proposed cable landfall site at Nukoliʻi Beach Park, the shoreline setback line is based on:

> (A) Forty feet plus 70 times the annual coastal erosion rate as measured from the certified shoreline. In addition to the shoreline setback calculations above, for all applicable lots subject to the Kauaʻi Coastal Erosion Study a mandatory 20 foot additional safety buffer shall be added to the setback area for episodic coastal events, sea level rise and other hazards; or
>
> (B) A shoreline setback line of 100 feet from the certified shoreline.

Based on this definition and an identified erosion rate of 1.13 feet per year (County of Kauaʻi 2025), the shoreline setback for this site is expected to be 141.9 feet from the certified shoreline (subject to a determination by the County of Kauaʻi Planning Department). A shoreline survey has been completed and an application for shoreline certification was submitted to the DLNR Land Division on September 8, 2025.

Based on the surveyed shoreline and anticipated shoreline setback distance, the BMH would be more than 300 feet inland of the surveyed shoreline. The only Project components within the shoreline setback would be the HDD conduit that would traverse underground (see Figure 16.1); as shown on the preliminary HDD profile, the conduit depth at the shoreline is expected to be approximately 60-65 feet below the ground surface. Pursuant to CZO Chapter 8-27.7, a variance is required for any structure that is not specifically identified as a permitted structure. It is anticipated that the Project would meet the requirements for a shoreline setback variance as a "private and public structure that is clearly in the public interest" (CZO Chapter 2-17.10(a)(7)).

5.4 City and County of Honolulu

5.4.1 Oʻahu General Plan

The Oʻahu General Plan sets forth the City and County's objectives and broad policies for the long-range development of the island of Oʻahu. First adopted in 1977, the Oʻahu General Plan was most recently updated in 2021. The General Plan focuses on total of 11 key areas of concern—population; economy; natural environment and resource stewardship; housing and communities; transportation and utilities; energy; physical development and urban design; public safety and community resilience; health and education; cultural and recreation; and government operations and fiscal management (DPP, 2021).

Overall, the Project is consistent with the various objectives and policies contained in the Oʻahu General Plan. The Project would directly support or otherwise not conflict with objectives and policies related to a balanced economy, natural environment and resource stewardship, transportation and utilities, physical development and urban design, and culture and recreation, as described below. While the Project would not directly relate to the objectives and policies for the other key areas addressed in the plan, it would indirectly benefit many of these areas by providing critical broadband infrastructure necessary for functionality of these areas (such as increased community resilience, support for health-care needs, and higher education).

Balanced Economy

Objective A: To promote diversified economic opportunities that enable all the people of Oʻahu to attain meaningful employment and a decent standard of living.

Policy 1: Support a strong, diverse, and dynamic economic base that protects the natural environment and is resilient to changes in global conditions.

Policy 2: Encourage the viability of businesses and industries, including support for small businesses, which contribute to the economic and social well-being of Oʻahu residents.

Policy 3: Pursue opportunities to grow and strategically develop non-polluting industries such as healthcare, agriculture, renewable energy, and technology in appropriate locations that contribute to Oʻahu's long-term environmental, economic, and social sustainability.

Discussion: *The State of Hawaiʻi recognizes broadband as foundational to Hawaiʻi's economic future and, as importantly, the quality of life of its residents (DBEDT 2020). The Project would provide critical broadband infrastructure to supplement existing infrastructure, which is aging and does not meet the current and projected future bandwidth demands associated with digital streaming and cloud technology. By providing increased broadband capacity and connectivity, the Project would directly support technological advancement, economic growth, diversification, and the well-being of Oʻahu residents. Broadband infrastructure is a non-polluting technology that promotes diversified economic opportunities.*

Natural Environment and Resource Stewardship

Objective A: To protect and preserve the natural environment.

Policy 1: Protect O‘ahu's natural environment, especially the shoreline, valleys, ridges, watershed areas, and wetlands from incompatible development.

Policy 4: Require development projects to give due consideration to natural features and hazards such as slope, inland and coastal erosion, flood hazards, water-recharge areas, and existing vegetation, as well as to plan for coastal hazards that threaten life and property.

Policy 5: Require sufficient setbacks from O‘ahu’s shorelines to protect life and property, preserve natural shoreline areas and sandy beaches, and minimize the future need for protective structures or relocation of structures.

Policy 8: Protect plants, birds, and other animals that are unique to the State of Hawai‘i and O‘ahu, and protect their habitats.

Policy 12: Plan, prepare for, and mitigate the impacts of climate change on the natural environment, including strategies of adaptation.

Discussion: *As detailed throughout this document, the Project has been sited and designed in a manner that avoids and minimizes impacts to the natural environment to the extent practicable. HDD would be used to install underground conduit beneath the shoreline to accommodate cable installation while avoiding and minimizing impacts to the shoreline. Due diligence studies of benthic marine resources were conducted and used to inform siting of the HDD punchout points and associated cable routes to avoid sensitive marine resources. The BMHs and other onshore Project components have been sited inland of the shoreline setback area in an area that is not expected to be subject to sea level rise until well beyond the system lifespan; the underground HDD conduit would be the only component within the shoreline setback area, and would traverse underground at a depth of approximately 30-35 feet below the shoreline (see Appendix C).*

Objective B: To preserve and enhance natural landmarks and scenic views of O‘ahu for the benefit of both residents and visitors as well as future generations.

Policy 1: Protect the island’s significant natural resources: its mountains and craters; forests and watershed areas; wetlands, rivers, and streams; shorelines, fishponds, and bays; and reefs and offshore islands.

Policy 2: Protect O‘ahu's scenic views, especially those seen from highly developed and heavily traveled areas.

Policy 3: Locate and design public facilities, infrastructure and utilities to minimize the obstruction of scenic views.

Policy 4: Protect and expand public access to the natural and coastal environment for recreational, educational, and cultural purposes, and maintain access in a way that does not damage natural, historic, or cultural resources.

Discussion: *The Project would result in short-term visual effects as well as temporary displacement of recreational areas as a result of construction activities and the presence of equipment and crews a*

portion of Barbers Point Beach Park. However, following construction, all Project components would be located underground or within existing buildings. As such, the Project would not affect any natural landmarks or scenic view, nor would it have any bearing on public access.

Transportation and Utilities

Objective C: To ensure reliable, cost-effective, and responsive service for all utilities with equitable access for residents.

Policy 1: Maintain and upgrade utility systems in order to avoid major breakdowns and service interruptions

Policy 3: Facilitate timely and orderly upgrades and expansions of utility systems.

Discussion: *The Project is consistent with the above-listed objective and policies as it would provide critical broadband infrastructure to supplement the aging broadband systems that are currently in place. By providing more robust and diverse routes for data transmission, the system would work together with existing and future last mile infrastructure systems to improve broadband access, availability, and reliability for residents and businesses across the island.*

Physical Development and Urban Design

Objective A: To coordinate changes in the physical environment of O‘ahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.

Policy 1: Provide infrastructure improvements to serve new growth areas, redevelopment areas, and areas with badly deteriorating infrastructure.

Policy 7: Encourage the clustering of development to reduce the cost of providing utilities and other public services.

Policy 11: Implement siting and design solutions that seek to reduce exposure to natural hazards, including those related to climate change, flooding, and sea level rise.

Discussion: *As described in Section 2.4.2, the Project location was modified to be located at Barbers Point Beach Park in order to align and maximize potential synergies with the proposed OSCT Project, which would provide first mile broadband infrastructure to link Hawai‘i to the continental U.S., other Pacific Islands, Australia, and Japan. While the two systems would have independent utility and serve different purposes (i.e. first mile versus middle mile infrastructure), collocating these two projects allows for shared use of the cable landing infrastructure, thus providing economies of scale and more efficient use of resources while also minimizing impacts. The siting and design of the two projects has been tightly coordinated to ensure compatibility, with all infrastructure sited to minimize potential exposure to sea level rise.*

Culture and Recreation

Objective D: To provide a wide range of recreational facilities and services that are readily available to residents and visitors alike, and to balance access to natural areas with the protection of those areas.

Policy 7: Ensure and maintain convenient and safe access to beaches, ocean environments and mauka recreation areas in a manner that protects natural and cultural resources.

Policy 12: Provide for safe and secure use of public parks, beaches, and recreation facilities.

Discussion: *The proposed cable landfall would be located at Barbers Point Beach Park. During construction, a portion of the beach park area would be temporarily used for equipment staging and construction activities. This area would be cordoned off for public safety purposes; however, the remainder of the beach park and all shoreline areas would continue to the accessible to the public. Similarly, during HDD and cable laying activities, ocean waters would remain open to the public throughout Project construction, with monitoring and buffer zones around active work areas to maintain public safety. Advanced notice of the work would be communicated to the public through the appropriate channels. Once installed, all cable landfall infrastructure would be located at or beneath the ground surface, and would have no bearing on recreational opportunities or other public access.*

5.4.2 ʻEwa Development Plan

The Oʻahu General Plan requires that community development plans be adopted by the City Council for each judicial district. These development plans are intended to provide detail for the elements presented in the General Plan and emphasize those elements most relevant to the issues and conditions of the specific area plan in order to guide public policy, infrastructure investment and land use decision making over the next 25 years. The Project is located within the City's ʻEwa Development Plan area. The ʻEwa Development Plan was originally adopted by the City Council in 1997 and was most recently revised in 2020 (Ordinance 20-46). The plan specifies a vision with elements related to protecting agricultural land, open space, and natural, historic, and cultural resources; developing a secondary urban center around the City of Kapolei; building master planned residential communities that support walking, biking, and transit use; and providing adequate infrastructure to serve both existing and planned development (DPP, 2020).

The key elements of the vision for development of ʻEwa include (1) community growth boundary; (2) retention of agricultural lands; (3) open space and greenways; (4) Kalaeloa Regional Park; (5) secondary urban center; (6) master planned residential communities; (7) communities designed to support non-automotive travel; (8) conservation of natural resources; (9) preservation and enhancement of historic and cultural resources; and (10) phased development. Discussion of the Project's compliance with the community growth boundary as well as applicable policies and guidelines is provided below.

Community Growth Boundary

The community growth boundary is intended to give long-range protection from urbanization for prime agricultural land and for preservation of open space while providing adequate land for urban development. The Project is located within the community growth boundary; as it would support economic growth and development across the island, while maintaining open space, it would be consistent with this policy.

Open Space Preservation and Development

General Policies:

- Use open space to:
  - Protect scenic views and natural, cultural, and historic resources.

- Provide recreation.
- Promote the accessibility of shoreline and mountain areas (as required by City Ordinance).

Guidelines:

- Shoreline Area
  - Identify and protect areas that are important to Native Hawaiian cultural practices.
  - Provide, at a minimum, a 60-foot setback along the shoreline, and, where possible, expand the setback to 150 feet where justified, based on historic or adopted projections of shoreline erosion rates.
  - Analyze the possible impact of sea level rise for new public and private projects in shoreline areas and incorporate, where appropriate and feasible, measures to reduce risks and increase resiliency to impacts of sea level rise.

Discussion: *The Project involves installation of cable landfall infrastructure within Barbers Point Beach Park. The BMHs and other onshore Project components have been sited inland of the shoreline setback area in an area that is not expected to be subject to sea level rise until well beyond the infrastructure design life. Only the HDD conduit, which would be installed at a substantial depth under the shoreline, would be within the setback area. During construction, a portion of the beach park area would be temporarily used for equipment staging and construction activities. This area would be cordoned off for public safety purposes; however, the remainder of the beach park and all shoreline areas would continue to the accessible to the public. Although short-term visual effects would occur during construction of the Project due to construction activities and the presence of equipment and crews, all construction equipment would be removed upon installation completion and temporarily disturbed areas would be returned to pre-existing conditions. All cable landfall infrastructure would be located underground; the only visual evidence would be at-grade BMH manhole covers. For these reasons, the Project would be consistent with the 'Ewa Development Plan's policies and guidelines for open space preservation and development.*

Historic and Cultural Resources

General Policies:

- Vary the treatment of sites according to their characteristics and potential value.
- Use in situ preservation and appropriate protection measures for historic, cultural, or archaeological sites with high preservation value because of their good condition or unique features, as recommended by the State Historic Preservation Officer. In such cases, the site should be either restored or remain intact out of respect for its inherent value.
- Retain significant vistas whenever possible.
- Where known archaeological and cultural sites have been identified and impact mitigations approved as part of prior development approvals, assume that the mitigations carry out the Plan vision and policies for preservation and development of historic and cultural resources in 'Ewa.

Guidelines:

- Public Views - Design and site all structures, where feasible, to reflect the need to maintain and enhance available views of significant landmarks and vistas. Whenever possible, relocate or place underground overhead utility lines and poles that significantly obstruct public views, under criteria specified in State law.

Discussion: *As part of the due diligence process for the Project, an LRFI was conducted to identify and document historic properties within the Project Area. This effort included archival research, a review of previous archaeological studies, and a pedestrian survey; no historic properties have been identified within the Project Area at Barbers Point Beach Park (see Section 3.8). In addition, a CIA and Ka Pa‘akai Analysis was also conducted to assess potential impacts of the Project on cultural resources as well as traditional and customary practices. The primary concerns identified through this effort include the potential to encounter iwi kūpuna; kalua were also identified as a valuable resource (see Section 3.9). Consultation is ongoing in accordance with both state and federal historic preservation requirements and will be completed prior to Project implementation. As part of this process, an AIS including subsurface testing is being conducted, and all mitigation measures identified by SHPD/SHPO would be implemented as part of the Project. Furthermore, consistent with the recommended measures in the CIA and Ka Pa‘akai Analysis, a Project-specific archaeological monitoring plan would be developed, including identification of areas with high cultural sensitivity that may warrant cultural monitoring during construction, as well as communications protocols, immediate protective treatment measures, and cultural protocols that would be implemented in the event of an inadvertent discovery. In addition to appropriately addressing all relevant historic and cultural resources, the Project would also only involve underground infrastructure for the O‘ahu cable landfall such that no public views or vistas would be affected. For these reasons, the Project would be consistent with the ‘Ewa Development Plan’s policies and guidelines for historic and cultural resources.*

Natural Resources

General Policies:

- Protect valuable habitat for waterbirds and other endangered animals and plants.
- Protect endangered fish and invertebrates in sinkholes.
- Require surveys for proposed new development areas to identify endangered species habitat, and require appropriate mitigations for adverse impacts on endangered species due to new development.
- Reduce light pollution's adverse impact on wildlife and human health and its unnecessary consumption of energy by using, where sensible, fully shielded lighting fixtures using lower wattage.

Discussion: *As detailed in Section 3.6, nearshore diver surveys were conducted to identify the marine benthic habitats, fish communities, and invertebrate assemblages present in nearshore waters, and to inform detailed routing and micrositing to avoid and minimize potential impacts to marine biological resources to the extent practicable. In addition, field surveys of terrestrial biological resources were conducted to characterize the species and habitats present, and to determine whether federally or state*

listed threatened or endangered species have the potential to occur. Section 3.6.3 and Section 3.7.3 identify measures that would be implemented to avoid and minimize impacts to marine and terrestrial biological resources, including federally and state-listed species, should any occur. The measures specifically include BMPs that address nighttime lighting. As such, the Project would be consistent with the 'Ewa Development Plan's policies related to natural resources.

5.4.3 Land Use Ordinance

The City and County of Honolulu's Land Use Ordinance (LUO; ROH Chapter 21) regulates land use by identifying the uses that are considered appropriate in each zoning district and the minimum standards and conditions that must be met if those uses are to be permitted. The purpose of the LUO is to regulate land use in a manner that will encourage orderly development in accordance with adopted land use policies, including the O'ahu General Plan and community development plans.

The Project Area is located within the P-2 (General Preservation) zoning district (see Figure 16.2). The purpose of the preservation district is to preserve and manage major open space and recreation lands and lands of scenic and other natural resource value. Uses and development standards in the P-2 (General Preservation) zoning district are specifically addressed in Section 21-3.40-1(c) of the LUO, which refers to Table 21-3 (Master Use Table) for permitted uses and structures. The proposed utility infrastructure associated with the O'ahu cable landing site is expected to be considered "Utility, Small" which is a permitted use in the P-2 zoning district, assuming compliance with applicable standards. Development standards relevant to the P-2 zoning district are listed in Table 21-3.1; these include minimum lot area, minimum lot width and depth, yard setbacks, maximum building area, and maximum height. The Project would comply with all applicable zoning development standards.

5.4.4 Special Management Area

As authorized by HRS Chapter 205A, the City and County of Honolulu regulates all land uses within the SMA to preserve, protect, and whenever possible, restore the natural resources of the coastal zone. The City and County of Honolulu's rules governing development within the SMA are set forth in ROH Chapter 25. Pursuant to ROH Chapter 25-1.2, no development may be undertaken within the SMA without permit approval. As the cable landfall infrastructure would constitute development within the SMA (see Figure 16.2) and would be valued at greater than $500,000, an SMA Major Permit would be required.[35] As detailed in ROH Section 25-5.3, an SMA Major Permit requires an environmental disclosure document prepared in accordance with the procedures set forth in HRS Chapter 343 and HAR Section 11-200.1; this Draft EA has been prepared in compliance with these requirements. Furthermore, a presentation to the applicable neighborhood board is required prior to application. Following submittal and acceptance of an application, SMA Use Permits require a public hearing and are approved by resolution of the Honolulu City Council.

Pursuant to ROH Chapter 25-3.1 and 25-4.1, the objective, policies, and guidelines for development within the SMA are the same as those contained in HRS Section 205A-2 and 205A-26; consistency with these objectives, policies, and guidelines is addressed in Section 5.2.4. ROH Section 25-6.1 also

[35] In the event that infrastructure constructed as part of the OSCT Project is utilized for the cable landfall, it is anticipated that installation of Project infrastructure would instead require an SMA Minor Permit (and no Shoreline Setback Variance).

specifies conditions for all development within the SMA, including shielding of exterior lighting and landscaping; the Project would comply with these permit conditions.

5.4.5 Shoreline Setback

Pursuant to HRS Chapter 205A-43, the City and County of Honolulu has established minimum shoreline setback requirements to (1) reduce exposure to coastal hazards and increase the resilience of the community; (2) protect and preserve the natural shoreline, coastal zone environments, and associated ecosystems, especially sandy beaches, coastal dunes, wetlands, and reefs; (3) protect and preserve public pedestrian access laterally along the shoreline and to the sea; (4) maintain, protect, and preserve open space and coastal scenic resources; and (5) prohibit shoreline hardening unless necessary for coastal restoration or where it would result in a clear public benefit. These rules, which are set forth in ROH Chapter 26, generally prohibit any structure or activity within the designated shoreline setback area (i.e. all land area between the shoreline and shoreline setback line) that may adversely affect beach processes, public access along the shoreline, or shoreline open space. Pursuant to ROH Section 26-1.4(a)(1), the shoreline setback line is established at the following distance mauka from the shoreline:

> Sixty feet on zoning lots where historical erosion data has not been collected for the Hawai'i shoreline study, or its successor, where the historical erosion data show coastal accretion, or where the historical erosion data show an annual coastal erosion rate of zero.

As no historical erosion data are available for the cable landing site based on the *Hawai'i Shoreline Study Web Map* (Coastal Research Collaborative 2021), it is understood that the shoreline setback line is 60 feet mauka of the certified shoreline. A shoreline survey has been completed and an application for shoreline certification submitted to the DLNR Land Division. Based on the surveyed shoreline and anticipated shoreline setback distance, the BMH would be approximately 350 feet inland of the surveyed shoreline. The only Project components within the shoreline setback would be the HDD conduits that would traverse underground (see Figure 16.2); the conduit depths at the shoreline are expected to be approximately 30-35 feet below the ground surface. Pursuant to ROH Chapter 26-1.8(b), a variance may be granted for a structure or activities that meets one of the following standards: (1) shoreline-dependent facility standard; (2) public interest standard; or (3) hardship standard.[36] The Project is expected to quality for a variance under the shoreline-dependent facility standard and/or the public interest standard.

[36] According to ROH Chapter 26-1.8(b), the shoreline-dependent facility standard applies to public infrastructure, drainage facilities, and boating, maritime, or water sport recreational facilities; provided that the proposal is the practicable alternative that best conforms to the purpose of the shoreline setback rules. The public interest standard applies to structures or activities that are necessary for or ancillary to facilities or improvements by a public agency or public utility regulated under HRS Chapter 269, or necessary for or ancillary to private facilities or improvements that are clearly in the public interest; provided that the proposal is the practicable alternative that best conforms to the purpose of this chapter and the shoreline setback rules.

5.5 Maui County

5.5.1 Maui County General Plan

The Maui County General Plan is a long-term, comprehensive blueprint for the physical, economic, environmental development and cultural identity of the county. As described in the Maui County Charter (2021 edition), "the general plan shall identify objectives to be achieved, and priorities, policies, and implementing actions to be pursued with respect to population density, land use maps, land use regulations, transportation systems, public and community facility locations, water and sewage systems, visitor destinations, urban design, and other matters related to development."

The Maui County 2030 General Plan is the decennial general plan update (thus replacing the General Plan of 1990) and includes multiple components. The first component consists of the Countywide Policy Plan, which was adopted by Ordinance No. 3732 in March 2010 and amended by Ordinance No. 5264 in September 2021 (County of Maui 2021). The Countywide Policy Plan presents the overall goals, objectives, policies, and implementing actions that portray the desired direction for the County (County of Maui 2010). It provides the overarching policy framework for the Maui Island Plan, as well as the respective community plans. The Maui Island Plan (adopted as Ordinance No. 4004 in December 2012) provides more specific direction for growth and decision-making with goals, objectives, policies and actions for the island of Maui. It delineates areas for future urban and rural growth as part of a Directed Growth Strategy, and identifies and addresses key environmental, housing and economic development issues (County of Maui 2012). In addition to these two components are specific community plans which provide focused recommendations to address the goals, objectives and policies of the General Plan, based on the values and unique attributes of each community plan area. A total of nine community plan areas have been identified within the county; the Project would include cable landing sites within the Wailuku-Kahului community plan area on Maui, the Molokai community plan area, and the Lanai community plan area. The following subsections discuss the extent to which the Project would comply with the intent of the applicable policies, objectives and provisions of each component of the general plan.

5.5.1.1 Countywide Policy Plan

The Countywide Policy Plan establishes goals, objectives, policies, and implementing actions that relate to the desired direction for the county. These relate to the following key themes: natural environment, local cultures and traditions, education, social and healthcare services, housing opportunities, local economy, parks and public facilities, transportation, physical infrastructure, land use and growth management, governance, and climate change (County of Maui 2021). Consistency with the applicable objectives and policies is discussed below.

Theme A: Protect the Natural Environment

The goal for this topic area is that Maui County's natural environment and distinctive open spaces will be preserved, managed, and cared for in perpetuity. The objectives and policies that are relevant to the Project are as follows:

Objective 1 Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations.

Policy a Perpetuate native Hawaiian biodiversity by preventing the introduction of invasive species, containing or eliminating existing noxious pests, and protecting critical habitat areas.

Policy c Restore and protect forests, wetlands, watersheds, and stream flows, and guard against wildfires, flooding, and erosion.

Policy e Protect the natural state and integrity of unique terrain, valued natural environments, and geological features.

Policy f Preserve and provide ongoing care for important scenic vistas, view planes, landscapes, and open-space resources

Discussion: *The Project has been sited and designed in a manner that avoids and minimizes impacts to natural resources to the extent practicable. HDD would be used to install underground conduit deep beneath the shoreline to accommodate cable installation while avoiding and minimizing impacts to sensitive environmental resources along the shoreline. Due diligence studies of both terrestrial and benthic marine resources were conducted and used to inform siting of the onshore and offshore Project components to avoid resources such as wetlands and coral reefs. Furthermore, a robust set of BMPs and other measures would be implemented throughout construction to avoid and minimize impacts to sensitive species and critical habitat areas, as well as to limit the potential for introduction and spread of invasive species. Once constructed, all cable landfall infrastructure would be located underground. The only new aboveground infrastructure to be installed as part of the Project would be the modular CLS structures; these would be located on UH campuses (Maui College and Molokai Education Center) and would be designed to match the existing campus buildings. No scenic vistas or viewplanes would be affected.*

Objective 2 Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island.

Policy a Protect and restore nearshore reef environments and water quality.

Policy b Protect marine resources and valued wildlife.

Discussion: *The Project would involve installation of subsea cable to provide critical broadband infrastructure for each of the main Hawaiian Islands, including Maui, Molokai, and Lānaʻi. The cable, with a maximum diameter of approximately 1.1 inches, would have a minimal footprint and would be surface laid on the ocean floor. A variety of existing and Project-specific data were used to inform the cable routing, to avoid and minimize areas with rugged or hard bottom habitat which could support more biological complexity. In addition, HDD would be used to install underground conduit deep beneath the shoreline to accommodate cable landfall while avoiding and minimizing impacts to sensitive environmental resources along the shoreline. Dive surveys were conducted and used to inform siting of the HDD punchout points and nearshore cable routes to avoid areas known to support corals to the extent practicable (see Section 3.6). Where it is not possible for the cable route to entirely avoid areas with coral, the cable would be hand-placed by divers to minimize impacts; the Project is not expected to result in the permanent loss of any corals. Similarly, impacts to marine wildlife would be avoided and minimized through a robust set of BMPs and other measures identified by NOAA Fisheries and USFWS. Once installed, as evidenced by subsea cable systems in other similar locations, it is expected that the*

cable would self-bury in areas of soft substrate; any segments that traverse hard bottom could be colonized by corals. Furthermore, BMPs would be implemented to avoid and minimize potential water quality impacts (see Section 3.5). As such, the Project is not expected to significantly affect marine resources.

Objective 3 Improve the stewardship of the natural environment.

Policy a Preserve and protect natural resources with significant scenic, economic, cultural, environmental, or recreational value.

Policy c Evaluate development to assess potential short-term and long-term impacts on land, air, aquatic, and marine environments.

Policy e Provide public access to beaches and shorelines for recreational and cultural purposes where appropriate.

Implementing Action

Action a Document, record, and monitor existing conditions, populations, and locations of flora and fauna communities.

Discussion: *As described in Sections 3.6 and 3.7, both marine and terrestrial biological resource surveys were conducted to characterize the species and habitats present, and to determine whether state or federally listed species, or otherwise rare plants or animals have the potential to occur and could be impacted by construction or operation of the Project. The results of these surveys and other due diligence studies were used to inform the Project siting and design process, evaluation of potential impacts, as well as the identification of measures to avoid and minimize impacts to sensitive environmental resources. While the Project would result in temporary impacts during construction, it would not restrict access to the shoreline, beach, or other areas used for recreational or cultural purposes. Once constructed, the cable landfall infrastructure would be located below ground and would have not have any bearing on public access. The only new aboveground infrastructure installed as part of the Project would be located within UH campuses and would not affect any natural resources with significant scenic, economic, cultural, or recreational value.*

Theme B: Preserve Local Cultures and Traditions

The goal for this topic area is that Maui County will foster a spirit of pono and protect, perpetuate, and reinvigorate its residents' multi-cultural values and traditions to ensure that current and future generations will enjoy the benefits of their rich island heritage. The objectives and policies that are relevant to the Project are as follows:

Objective 1 Perpetuate the Hawaiian culture as a vital force in the lives of residents.

Policy a Protect and preserve access to mountain, ocean, and island resources for traditional Hawaiian cultural practices.

Policy b Prohibit inappropriate development of cultural lands and sites that are important for traditional Hawaiian cultural practices and establish mandates for the special protection of these lands in perpetuity.

Discussion: *As detailed in Section 3.9, a CIA and Ka Pa‘akai Analysis was conducted to identify cultural beliefs, practices, and resources that could be affected by the Project. This effort included archival and background research, historic document review, and community consultation. Cultural resources and practices identified through this process include potential subsurface cultural resources (particularly burials), marine resources (such as coral ecosystems, wildlife, and benthic habitats), and subsistence-based activities and recreational activities in the nearshore environment. Recommendations identified through the CIA and Ka Pa‘akai Analysis to avoid and minimize impacts to these resources have been incorporated into the Project, as detailed in Section 3.9.3.3, such that no significant impacts are anticipated.*

Objective 4 Preserve and restore significant historic architecture, structures, cultural sites, cultural districts, and cultural landscapes.

Policy a Support the development of an island-wide historic, archaeological, and cultural resources inventory.

Discussion: *As detailed in Section 3.8, an LRFI was conducted to identify and document historic properties within the Project Area. Based on consultation with SHPD, an AIS including subsurface testing is being completed. State and federal historic preservation requirements will be fulfilled prior to Project implementation, with all mitigation measures identified by SHPD implemented as part of the Project. In addition, a CIA and Ka Pa‘akai Analysis was conducted to assess potential impacts of the Project on cultural resources as well as traditional and customary practices. Recommendations identified through the CIA and Ka Pa‘akai Analysis to avoid and minimize impacts to cultural resources and practices would also be implemented as part of the Project, as detailed in Section 3.9.3.3. As such, due diligence efforts conducted for the Project support the Countywide Plan objective and policy related to development of an island-wide historic, archaeological, and cultural resources inventory.*

Theme F: Strengthen the Local Economy

The goal for this topic area is that Maui County’s economy will be diverse, sustainable, and supportive of community values. The objectives and policies that are relevant to the Project are as follows:

Objective 1 Promote an economic climate that will encourage diversification of the County’s economic base and a sustainable rate of economic growth.

Policy a Support economic decisions that create long-term benefits.

Policy c Invest in infrastructure, facilities, and programs that foster economic diversification.

Policy j Support efforts to improve conditions that foster economic vitality in our historic small towns.

Policy l Support public and private entities that assist entrepreneurs in establishing locally operated businesses.

Discussion: *The State of Hawai‘i recognizes broadband as foundational to Hawai‘i’s economic future (DBEDT 2020). The Project would provide Maui with robust middle mile broadband infrastructure, which would significantly increase the capacity and reliability of high-speed internet for agencies, businesses, and residents across the island. This critical infrastructure would contribute to economic growth by enabling local businesses to incorporate technological advancements and reach wider markets, as well*

as support economic diversification by attracting new industries, enabling remote workers, and enhancing virtual communication and collaboration. As such, the Project would contribute to economic diversification and sustainable growth in compliance with the stated objective and policies.

Theme G: Improve Parks and Public Facilities

The goal for this topic area is a full range of island-appropriate public facilities and recreational opportunities that improve the quality of life for residents and visitors. The objectives and policies that are relevant to the Project are as follows:

Objective 1 Expand access to recreational opportunities and community facilities to meet the present and future needs of residents of all ages and physical abilities.

Policy a Protect, enhance, and expand access to public shoreline and mountain resources.

Discussion: *Within Maui County, the proposed cable landfalls would be located at the Kahului Harbor western breakwater area, Molokai Yacht Club, and the southern parking lot for Mānele Small Boat Harbor. During construction, a portion of these areas would be temporarily used for equipment staging and construction activities. Temporary construction work areas would be cordoned off for public safety purposes; however, the surrounding areas, including all recreational and harbor facilities, would continue to be accessible to the public. Similarly, during HDD and cable laying activities, ocean waters would remain open for recreational use throughout Project construction, with monitoring and buffer zones around active work areas to maintain public safety. Advanced notice of the work would be communicated to the public through the appropriate channels. Once installed, all cable landfall infrastructure would be located at or beneath the ground surface, and would have no bearing on public access.*

Theme J: Promote Sustainable Land Use and Growth Management

The goal for this topic area is that community character, lifestyles, economies, and natural assets will be preserved by managing growth and using land in a sustainable manner. The objectives and policies that are relevant to the Project are as follows:

Objective 1 Improve land use management and implement a directed-growth strategy.

Policy i Preserve the public's rights of access to and continuous lateral access along all shorelines.

Discussion: *HDD would be used to install underground conduit beneath the shoreline to accommodate cable installation while avoiding and minimizing impacts to sensitive environmental resources along the shoreline. During construction, a portion of each cable landing site would be used for HDD and other construction activities. However, access to and along the shoreline would be fully maintained. Once installed, all cable landfall infrastructure would be located at or beneath the ground surface, and would have no bearing on public access.*

Objective 4 Improve and increase efficiency in land use planning and management.

Policy a Assess the cumulative impact of developments on natural ecosystems, natural resources, wildlife habitat, and surrounding uses.

Policy b Ensure that new development projects requiring discretionary permits demonstrate a community need, show consistency with the General Plan, and provide an analysis of impacts.

Policy g Improve land use decision making through the use of land- and geographic information systems.

Discussion: *The Project would provide critical broadband infrastructure, which has been identified as foundational to the state's future economic growth and residents' quality of life (DBEDT 2020). In addition, the Project would help to address an important community need for reliable broadband connectivity as reflected by objectives and policies at multiple levels of the Maui County General Plan. As detailed throughout this document, the potential impacts to natural ecosystems, biological resources, wildlife habitat, and surrounding uses have been considered; measures to avoid, minimize and mitigate potential impacts have been incorporated into the Project. The Project team has engaged with governmental agencies, organizations, community members, and other stakeholders to inform them of the Project as well as to obtain feedback for consideration in the design and development process. For these reasons, the Project is consistent with the objective and policies of the Countywide Policy Plan related to sustainable land use and growth management.*

Theme K: Strive for Good Governance

The goal for this topic area is that government services will be transparent, effective, efficient, and responsive to the needs of residents. The objectives and policies that are relevant to the Project are as follows:

Objective 2 Promote civic engagement.

Policy a Foster consensus building through in-depth, innovative, and accessible public participatory processes.

Policy b Promote and ensure public participation and equal access to government among all citizens.

Policy g Expand opportunities for all members of the public to participate in public meetings and forums.

Policy h Facilitate the community's ability to obtain relevant documentation.

Implementing Actions

d Develop a project-review process that mandates early and ongoing consultation in and with communities affected by planning and land use activities.

Discussion: *As discussed in Section 6, the Project team initiated outreach and consultation with Project stakeholders early in the planning process to provide information about the proposed broadband infrastructure and to request stakeholder input. Input obtained through this process has been incorporated into the Project development process, resulting in refinement of the configuration and layout of Project infrastructure. Furthermore, this Draft EA has been prepared to disclose Project-related impacts and to solicit agency and public review. Community engagement efforts will continue over the*

course of the Project development and implementation process, consistent with the objective and policies of the Countywide Policy Plan related to civic engagement.

Theme L: Mitigate Climate Change and Work Toward Resilience

The goal for this topic area is to minimize the causes and negative effects of climate change. The objectives and policies that are relevant to the Project are as follows:

Objective 2 Reduce the impacts of sea-level rise by acknowledging climate change, adapting, mitigating, and planning accordingly.

Policy a Evaluate development to assess potential short-term and long-term sea-level rise impacts on nearshore environments.

Policy j Move or rebuild public facilities away from nearshore environments to account for sea-level rise to the extent reasonable.

Discussion: *As subsea cable systems are specifically designed and built for the marine environment, they are resilient to coastal flooding. Regardless, the Project design incorporates a minimum design standard based on the 1.1-foot SLR-XA, as this roughly equates to the current mid-range sea level rise projection for 2050, which generally corresponds to the design life of the subsea cable system. As such, the BMH (and all terrestrial infrastructure extending inland from the BMH) at each cable landfall has been sited outside the 1.1-foot SLR-XA, at a minimum. Where practicable, this infrastructure has been set back further, beyond the 2-foot and/or 3.2-foot SLR-XA. In the case of the Maui and Lanai cable landing sites, there would be no infrastructure within the SLR-XA beyond the underground HDD conduit installed beneath the shoreline. Given the extent of the SLR-XA on Molokai, the BMH and a limited amount of terrestrial conduit for this cable landing site would be within the 2.0-foot and 3.2-foot SLR-XA; however, based on current projections, these are areas that are only expected to be subject to inundation over the longer-term (beyond the design life of the project). Although the coastal erosion boundary is not mapped at this location, coastal erosion is not anticipated to be a risk to the Project because of the protection afforded by the offshore reef. The infrastructure would be monitored on a regular basis over the life of the Project to identify potential impacts of coastal flooding and erosion. Although unlikely to be required, measures to address impacts associated with inundation or erosion would be implemented as needed. As the Project is a shoreline-dependent activity, incorporates a design that is resilient and responsive to climate change policy, and would monitor and mitigate any potential issues, it would be consistent with the Countywide Plan objective and policies related to climate change.*

5.5.1.2 Maui Island Plan

The Maui Island Plan provides direction for future growth, the economy, and social and environmental decisions based on the following vision for the island of Maui: “Ua mau ke ea o ka ʻāina i ka pono. Maui Island will be environmentally, economically, and culturally sustainable with clean, safe, and livable communities and small towns that will protect and perpetuate a pono lifestyle for the future” (County of Maui 2012). The plan specifies a set of core values and identifies supporting goals, objectives, and policies related to the use and development of land, extension and improvement of transportation services and infrastructure, development of community facilities, expansion of the island’s economic base, provision of housing, and protection of natural and cultural resources. The goals, objectives and policies within the Maui Island Plan that are applicable to the Project are discussed below.

Heritage Resources

The discussion of heritage resources presents goals related to cultural, historic, and archaeological resources; shoreline, reef, and nearshore waters; watersheds, streams, and wetlands; wildlife and natural areas; and scenic resources. The goals, objectives, and policies that are relevant to the Project are discussed below.

Goal 2.1: Our community respects and protects archaeological and cultural resources while perpetuating diverse cultural identities and traditions.

Objective 2.1.3 Enhance the island's historic, archaeological, and cultural resources.

Policy 2.1.3.c Support regulations to require developers, when appropriate, to prepare an Archaeological Inventory Survey, Cultural Impact Assessment, and Ethnographic Inventories that are reviewed and commented upon by the Office of Hawaiian Affairs, Native Hawaiian advisory bodies, the State Historic Preservation Division (SHPD), and the Office of Environmental Quality Control, and systematically comply with the steps listed in SHPD's administrative rules, including consultation and monitoring during construction phases of projects.

Policy 2.1.3.h Ensure compliance with historic preservation laws, and discourage demolition of properties that are determined to be eligible for listing on the National or State Register of Historic Places.

Discussion: *As detailed in Section 3.8, an LRFI was conducted to identify and document historic properties within the Project Area. Based on consultation with SHPD, an AIS including subsurface testing is being completed. State and federal historic preservation requirements will be fulfilled prior to Project implementation, with all mitigation measures identified by SHPD implemented as part of the Project, including monitoring during construction. In addition, a CIA and Ka Pa'akai Analysis was conducted to assess potential impacts of the Project on cultural resources as well as traditional and customary practices. Recommendations identified through the CIA and Ka Pa'akai Analysis to avoid and minimize impacts to cultural resources and practices would also be implemented as part of the Project, as detailed in Section 3.9.3.3. As such, due diligence and regulatory compliance efforts for the Project support the Maui Island Plan objective and policies related to archaeological and cultural resources.*

Goal 2.2: An intact, ecologically functional system of reef, shoreline, and nearshore waters that are protected in perpetuity.

Objective 2.2.3 Water quality that meets or exceeds State Clean Water Act standards.

Policy 2.2.3.a Reduce the amount of impervious surface and devise site plan standards that aim to minimize storm runoff and NPS pollution.

Discussion: *The Project has been designed to avoid onshore surface water features; ground disturbing activities would be limited in extent and adequately set back from the shoreline. A SWPPP and erosion control plan would be prepared prior to construction, detailing the BMPs to be implemented to prevent and minimize discharge of pollutants, including erosion prevention, sediment control, and good housekeeping measures. The Project would add only a minimal amount of impervious surface and would have a negligible impact on nearshore resources. As such, the Project would be consistent with the*

objective and policies in the Maui Island Plan relating to maintenance of water quality and protection of nearshore waters.

Goal 2.4: Maui's natural areas and indigenous flora and fauna will be protected.

Objective 2.4.1	A comprehensive management strategy that includes further identification, protection, and restoration of indigenous wildlife habitats.
Policy 2.4.1.b	Require flora and fauna assessment and protection plans for development in areas with concentrations of indigenous flora and fauna; development shall comply with the assessment and protection plan and shall use the avoidance, minimization, and mitigation approach respectively, with an emphasis on avoidance.

Discussion: *As detailed in Section 3.6, nearshore dive surveys were conducted to identify the benthic habitats, fish communities, and invertebrate assemblages present in nearshore waters, and to inform detailed routing and micrositing to avoid and minimize potential impacts to marine biological resources to the extent practicable. In addition, as detailed in Section 3.7, surveys of terrestrial biological resources were conducted to characterize the species and habitats present, and to determine whether federally or state listed threatened or endangered species have the potential to occur. Section 3.6.3 and Section 3.7.3 identify measures that would be implemented to avoid and minimize impacts to marine and terrestrial biological resources, including native federally and state-listed species, should any occur.*

Goal 2.5: Maui will continue to be a beautiful island steeped in coastal, mountain, open space, and historically significant views that are preserved to enrich the residents' quality of life, attract visitors, provide a connection to the past, and promote a sense of place.

Objective 2.5.1	A greater level of protection for scenic resources.
Policy 2.5.1.b	Identify, preserve, and provide ongoing management of important scenic vistas and open space resources, including mauka-to-makai and makai-to-mauka view planes.
Policy 2.5.1.c	Protect "night sky" resources by encouraging the implementation of ambient light ordinances and encouraging conversion of all sources that create excessive light pollution, affecting our ability to view the stars.
Objective 2.5.2	Reduce impacts of development projects and public-utility improvements on scenic resources.
Policy 2.5.2.a	Enforce the policies and guidelines of the SMA regarding the protection of views
Policy 2.5.2.f	Ensure little or no effect on scenic resources from utility improvements, primarily power poles.

Discussion: *The Project would result in short-term visual effects as a result of construction activities and the presence of equipment and crews within the Project Area. However, following construction, all cable landfall infrastructure would be located underground. The only new aboveground infrastructure installed as part of the Project would be the CLS, consisting of a new modular structure and emergency generator within the UH Maui College campus; views of the CLS would generally be limited to Wahinepio*

Avenue and nearby campus buildings. Furthermore, the Project would not involve operational nighttime lighting. As such, the Project would not affect any important scenic vistas, scenic resources, shoreline views, nor would it affect "night sky" resources.

Natural Hazards

The goals, objectives, and policies related to natural hazards that are relevant to the Project are discussed below.

Goal 3.1: Maui will be disaster resilient.

Objective 3.1.2 Greater protection of life and property.

Policy 3.1.2.d Encourage the use of construction techniques that reduce the potential for damage from natural hazards.

Discussion: *While it is not possible for the Project to avoid placement of cable landfall infrastructure within the coastal flood hazard zone and tsunami evacuation zone, this infrastructure would be installed underground; furthermore, these types of systems are designed and built for the marine environment such that they can withstand potential inundation. While the CLS at UH Maui College has been sited outside of the flood hazard zone, it would be at the edge of the tsunami evacuation zone. It would be designed and constructed in compliance with all applicable state and local building codes and other requirements related to the tsunami zone and other potential natural hazards. As such, the Project would be consistent with the plan objectives and policies related to use of appropriate construction techniques to maximize disaster resilience.*

Economic Development

The discussion of economic development relates to economic diversification, tourism, agriculture, emerging sectors, small business development, health care, and education and workforce development. The goals, objectives, and policies that are relevant to the Project are discussed below.

Goal 4.1: Maui will have a balanced economy composed of a variety of industries that offer employment opportunities and well-paying jobs and a business environment that is sensitive to resident needs and the island's unique natural and cultural resources.

Objective 4.1.3 Improve the island's business climate.

Policy 4.1.3.a Upgrade, maintain the quality of, and improve access to telecommunications infrastructure.

Discussion: *The Project would provide critical broadband infrastructure to supplement existing infrastructure, which is aging and does not meet the current and projected future bandwidth demands associated with digital streaming and cloud technology. By providing increased broadband capacity and reliability, the Project would directly support this policy for upgraded and improved telecommunications infrastructure to support Maui's business and resident needs.*

Goal 4.4: A diverse array of emerging economic sectors.

Objective 4.4.1 Support increased investment and expanded activity in emerging industries.

Policy 4.4.1.a Support the development of and access to state-of-the-art voice, video, and data telecommunications systems and high-speed Internet.

Discussion: *The Project would provide Maui with robust middle mile broadband infrastructure, which would significantly increase the capacity and reliability of high-speed internet for the island's businesses and residents. This critical infrastructure would contribute to economic growth by enabling businesses to adopt digital services and reach wider markets, as well as support economic diversification by attracting new industries, enabling remote workers, and enhancing virtual communication and collaboration.*

Directed Growth Plan

A key element of the Maui Island Plan is the establishment of a Directed Growth Strategy, which prescribes areas for future growth as well as protection from development. The Project is located within the urban growth boundary as designated by the Maui Island Plan (Map C2). As the Project would support economic growth and development across the island, while maintaining open space, it would be consistent with the urban growth strategy. Furthermore, the Project would not affect any protected areas. For these reasons, the Project is considered to be consistent with the Directed Growth Strategy.

5.5.1.3 Wailuku-Kahului Community Plan

The Maui cable landing site is within the Wailuku-Kahului community plan area, which is one of nine community plans for Maui County. It provides specific recommendations to address the goals, objectives, and policies contained in the General Plan, while recognizing the historic values and unique spiritual significance of island cultures of Wailuku-Kahului, in order to enhance the region's overall living environment. The plan was adopted by Ordinance No. 1674 in 1987 and updated in 2002, with an amendment in 2019 via Ordinance No. 4996. Goals, objectives, and policies that are relevant to the Project are discussed below.

Economic Activity

Goal: A stable and viable economy that provides opportunities for growth and diversification to meet long-term community and regional needs and in a manner that promotes agricultural activity and preserves agricultural lands and open space resources.

Objectives and Policies

5. Recognize the importance of small businesses to the region's economy.

Discussion: *The State of Hawai'i recognizes broadband as foundational to Hawai'i's economic future and, as importantly, the quality of life of its residents (DBEDT 2020). The Project would provide critical broadband infrastructure to support all manners of business, including small businesses and entrepreneurs. The Project would not adversely affect agricultural lands or open space resources.*

Environment

Goal: A clean and attractive physical and natural environment in which man-made developments or alterations to the natural environment relate to sound environmental and ecological practices, and important scenic and open space resources are maintained for public use and enjoyment.

Objective and Policies

5. Require that new shoreline development respect shoreline resources and maintain public access.

9. Maintain coastal open space along the region's shoreline as a scenic amenity and public recreational area.

Discussion: *As the subsea fiber optic cable must make landfall to facilitate interconnection with Maui's existing telecommunications network, it is a shoreline-dependent activity. However, the Project has been designed in a manner that avoids and minimizes impacts to the surrounding environment to the extent practicable, including the use of HDD to install the cable deep under the shoreline. During construction, a portion of the Kahului Harbor breakwater area would be temporarily used for equipment staging and construction activities. This area would be cordoned off for public safety purposes; however, the remainder of the breakwater area and the full extent of shoreline would remain accessible to the public. Following cable installation, construction equipment would be removed, temporarily disturbed areas would be returned to pre-existing conditions, and full access would be restored. All cable landfall infrastructure would be located underground; the only visual evidence would be an at-grade BMH manhole cover. Over the long-term, all scenic and recreational values associated with the Kahului Harbor breakwater area would be maintained. The CLS at UH Maui College would not be located along the shoreline, and would not affect any scenic or open space resources.*

Cultural Resources

Goal: Identification, protection, preservation, enhancement, and where appropriate, use of cultural practices and sites, historic sites and structures, and cultural landscapes and view planes that: (1) provide a sense of history and define a sense of place for the Wailuku-Kahului region; and (2) preserve and protect native Hawaiian rights and practices customarily and traditionally exercised for subsistence, cultural and religious purposes in accordance with Article XII, Section 7, of the Hawai'i State Constitution, and the Hawai'i Supreme Court's PASH opinion, 79 HAW. 425 (1995).

Objective and Policies

5. Require development projects to identify all cultural resources located within the project area as part of initial project studies. Further, require that all proposed activity include recommendations to mitigate potential adverse impacts on cultural resources.

Implementing Actions

2. Require development projects to identify all cultural resources located within or adjacent to the project area and consult with individuals knowledgeable about such cultural resources prior to application as part of the County development review process. Further, require that all proposed activity include recommendations to mitigate potential adverse impacts on cultural resources including site avoidance, adequate buffer areas, and interpretation. Particular attention should be directed toward dune areas, known and probable pre-contact habitation areas, and other sites and areas listed in No. 5 below, with review by the Cultural Resources Commission, where appropriate.

Discussion: *As detailed in Section 3.9, a CIA and Ka Pa'akai Analysis was conducted to identify cultural beliefs, practices, and resources that could be affected by the Project. This effort included archival and background research, historic document review, and community consultation. Cultural resources and*

practices identified through this process include potential subsurface cultural resources (particularly burials), marine resources (such as coral ecosystems, wildlife, and benthic habitats), and subsistence-based activities and recreational activities in the nearshore environment. Recommendations identified through the CIA and Ka Paʻakai Analysis to avoid and minimize impacts to these resources have been incorporated into the Project, including implementation of a Project-specific archaeological monitoring plan, in consultation with SHPD, with site-specific protocols to be followed in the event of an inadvertent discovery of iwi kūpuna or other culturally significant materials.

Recreation

Objectives and Policies

2. Ensure adequate public access to shoreline recreation resources by pursuing access ways identified by the County.

12. Maintain existing recreational uses at the Kahului harbor for canoe club activities. When development occurs, provide alternate sites for canoe club activities at the Kahului Bay area.

Discussion: *The proposed cable landfall would be located at the western breakwater area for Kahului Harbor. During construction, a portion of the breakwater area would be temporarily used for equipment staging and construction activities. This area would be cordoned off for public safety purposes; however, the remainder of the breakwater area, including all recreational and harbor facilities as well as the shoreline, would continue to the accessible to the public. Similarly, during HDD and cable laying activities, ocean waters would remain open to recreational activities (including canoe paddling) throughout Project construction, with monitoring and buffer zones around active work areas to maintain public safety. Advanced notice of the work would be communicated to the public through the appropriate channels. Once installed, all cable landfall infrastructure would be located at or beneath the ground surface and would have no bearing on public access or recreational uses.*

Government

Goal: Government that demonstrates the highest standards of fairness; responsiveness to the needs of the community; fiscal integrity; effectiveness in planning and implementation of programs and projects; a fair and equitable approach to taxation and regulation; and efficient, results-oriented management.

Objectives and Policies

6. Support public and private partnerships to fund the planning and construction of infrastructure.

Discussion: *The Project would be implemented through a public-private partnership, which would leverage substantial federal funding to provide critical broadband infrastructure for the six main Hawaiian Islands, including Maui.*

Land Use

Goal: An attractive, well-planned community with a mixture of compatible land uses in appropriate areas to accommodate the future needs of residents and visitors in a manner that provides for the

social and economic well-being of residents and the preservation and enhancement of the region's environmental resources and traditional towns and villages.

Objectives and Policies

10. All zoning applications and/or proposed land uses and developments shall conform with the planned use designations, as specified in the adopted Community Plan Land Use Map, and be consistent with the Community Plan policies.

Discussion: *Based on the Community Plan Land Use Map, the cable landfall would be within an area designated as Park, which includes development for recreational use. The CLS would be located in an area designated as Public/Quasi-Public, which includes public utilities. As the Project would be a public utility and would not preclude or impede recreational uses, it would be consistent with the Community Plan land use designations. Furthermore, as detailed throughout this document, it would be consistent with all applicable Community Plan policies.*

5.5.1.4 Molokai Island Community Plan

The Molokai Community Plan, which represents one of Maui County's nine community plan areas, was initially adopted in 1984 and updated in 2001. The plan was most recently updated and adopted by the Maui County Council on December 17, 2018, and was renamed as the Molokai Island Community Plan to acknowledge the different communities across the island (County of Maui 2018). The plan identifies current and anticipated future conditions and needs, and lays out strategic planning goals, policies, and actions to guide decision-making through 2035. The Project would comply with all applicable goals and policies, as further discussed below.

Natural Resources

Goal: Preserve, protect, and manage Molokai's exceptional natural land and water resources to ensure that future generations may continue to enjoy and protect the island environment.

Policies

3. Encourage protection and restoration of the biodiversity of native plant and animal terrestrial, freshwater, and marine species and habitats through land conservation, resource management, education, invasive species prevention and control, wildfire prevention, and stewardship.

5. Ensure the design and construction of new development protect surface water, groundwater, and coastal water quality from nonpoint and point source pollution.

15. Protect and maintain Molokai's oceans, beaches, and other recreational areas to ensure a safe environment for recreational and cultural activities.

Discussion: *The Project would involve installation of subsea cable to provide critical broadband infrastructure for the island of Molokai. The cable, with a maximum diameter of approximately 1.1 inches, would have a minimal footprint and would be surface laid on the ocean floor. A variety of existing and Project-specific data were used to inform the cable routing, to avoid and minimize areas with rugged or hard bottom habitat which could support more biological complexity. In addition, HDD would be used to install underground conduit beneath the shoreline to accommodate cable landfall while*

avoiding and minimizing impacts to sensitive environmental resources along the shoreline. Dive surveys were conducted to microsite the HDD punchout point and nearshore cable route to avoid areas known to support corals to the extent practicable. Where it is not possible for the cable route to entirely avoid areas with coral, the cable would be hand-placed by divers to minimize impacts; the Project is not expected to result in the permanent loss of any corals. Similarly, terrestrial biological surveys were conducted to characterize the species and habitats present, and to determine whether federally or state listed threatened or endangered species have the potential to occur. As detailed throughout this document, a variety of measures would be implemented to avoid, minimize, and mitigate potential impacts to native species, natural resources, water quality, and other environmental resources, including invasive species prevention and control, such that significant impacts are not anticipated. Once installed, the cable landfall infrastructure would be located entirely at or beneath the ground surface such that there would be no impacts to recreational activities or public access.

Heritage Resources

Goal: Molokai's cultural, historic, and archaeological sites, and cultural practices will be protected and perpetuated for their cultural and historical value, and for enjoyment of and sustainable use by future generations.

Policies

3. Where appropriate, require identification and mitigation of potential impacts to subsistence activities and resources when reviewing development permits and discretionary land use proposals.
4. Support access for subsistence hunting, fishing, and gathering. Support appropriate public access to the shoreline, public trails, and hunting areas in a manner that protects natural and cultural resources and respects cultural practices.
5. Protect and support Native Hawaiian rights customarily and traditionally exercised for subsistence, cultural, and religious purposes in accordance with Article XII, Section 7, Hawai'i State Constitution, Sections 1-1 and 7-1, and Hawai'i court decisions.
14. Ensure that permits for any project that may affect historic property are provided to SHPD for review, and that SHPD's recommendations are issued as permit conditions.

Discussion: *As detailed in Section 3.8, an LRFI was conducted to identify and document historic properties within the Project Area. Based on consultation with SHPD, an AIS including subsurface testing is being completed. State and federal historic preservation requirements will be fulfilled prior to Project implementation, with all mitigation measures identified by SHPD implemented as part of the Project, including monitoring during construction. In addition, a CIA and Ka Pa'akai Analysis was conducted to assess potential impacts of the Project on cultural resources as well as traditional and customary practices. Recommendations identified through the CIA and Ka Pa'akai Analysis to avoid and minimize impacts to cultural resources and practices would also be implemented as part of the Project, including maintenance of access to the beach, shoreline, and nearshore waters, as detailed in Section 3.9.3.3. As such, due diligence and regulatory compliance efforts for the Project support the Molokai Island Community Plan objective and policies related to heritage resources.*

Scenic Resources

Goal: Preserve and protect diverse scenic resources for future generations.

Policies

1. Restrict or mitigate the impact of development on scenic resources.
2. Ensure development is designed to protect scenic roadway views and significant views of ridgelines and hillslopes to maintain open space scenic character.

Discussion: *The Project would result in short-term visual effects as a result of construction activities and the presence of equipment and crews within the Project Area. However, following construction, all cable landfall components would be located underground; the only visible component would be an at-grade BMH cover. The CLS structure would be a small modular structure with an associated emergency generator installed on the Molokai Education Center campus; it would be designed to match the existing campus structures and would generally only be visible from portions of Duke Maliu Regional Park, Kamehameha V Highway, and residences to the southwest beyond the highway. As such, the Project would not affect any significant or scenic views.*

Hazards

Goal: Molokai will be prepared for natural and human-created hazards.

Policies

6. Encourage the location or relocation of all critical infrastructure, facilities, and development out of the evacuation and inundation zones vulnerable to coastal hazards in accordance with the 2012 Hawai‘i State Climate Change Adaption Adaptation Priority Guidelines and the Hazard Mitigation Plan.

Discussion: *As with much of the area surrounding Kaunakakai, the proposed cable landfall at Molokai Yacht Club is almost entirely within the SLR-XA. The BMH would be located in an area within the 3.2-foot scenario SLR-XA; portions of the buried conduit for the terrestrial cable would also intersect with the 2.0-foot scenario SLR-XA. However, this infrastructure is resilient to coastal flooding as it is specifically designed and built for the marine environment; furthermore, the potential effects of sea level rise associated with the 2.0-foot and 3.2-foot scenario are not anticipated to occur until well beyond the infrastructure design life. Although the coastal erosion boundary is not mapped at this location, coastal erosion is not anticipated to be a risk to the Project because of the protection afforded by the offshore reef. The infrastructure would be monitored on a regular basis over the life of the Project to identify potential impacts of coastal flooding and erosion. Although unlikely to be required, potential erosion could be mitigated using imported fill to stabilize buried infrastructure and/or by re-burying the facilities at a lower elevation to maintain ground clearance; chronic BMH inundation could be addressed through installation of a riser. The CLS structure would be designed and constructed in compliance with all applicable state and local building codes and requirements as related to potential natural hazards. For these reasons, the Project is expected to be resilient to sea level rise and coastal hazards.*

Economic Development

Goal: A stable, balanced, diversified, and sustainable economy, respecting cultural and natural resources, that is compatible with Molokai's rural island lifestyle.

Policies

1. Support diversification of Molokai's economy.

14. Support and encourage cottage and mini-industries, such as garment and craft production, as residential-based economic activities, provided such activities are compatible with the surrounding neighborhood.

Discussion: *The State of Hawai'i recognizes broadband as foundational to Hawai'i's economic future and, as importantly, the quality of life of its residents (DBEDT 2020). The Project would provide critical broadband infrastructure to support growth and diversification of all manners of business, including cottage industries and residential-based entrepreneurs.*

Land Use

Goal: Molokai's land use pattern will protect agricultural lands, open space, and natural and cultural resources, and support livable small towns and rural communities.

Policies

12. Regulate land use in a manner that reaffirms and respects customary and traditional rights of Native Hawaiians as mandated by Article 12, Section 7, Constitution of the State of Hawai'i.

16. Evaluate the impact public utility facilities development and land use changes will have on natural and cultural resources, cultural practices, and Native Hawaiian burials.

17. Consult with and solicit input from community members, including community members with generational knowledge, early and often about how to minimize the impact of proposed changes to the use of land on cultural practices, cultural sites, and culturally significant areas, including burials.

Discussion: *A variety of community outreach efforts have been conducted over the course of the Project development process, including community meetings as well as other engagement to solicit input. In particular, a CIA and Ka Pa'akai Analysis was conducted to identify cultural beliefs, practices, and resources that could be affected by the Project. This effort included archival and background research, historic document review, and community consultation. The key concern identified through community consultation is potential disruption of the marine environment and impacts to marine ecosystems, including the nearshore and benthic environments. As further detailed in Section 3.9.2.4, the subsea cable would be installed under the shoreline using HDD, an industry-standard approach used to minimize impacts to sensitive environments; beyond the HDD punchout, the cable would be surface-laid on the seafloor with hand-placement by divers to minimize impacts to corals in the nearshore waters; over time, it is expected that the cable would self-bury in areas of soft substrate. The Project would not restrict access to the beach, shoreline, or nearshore waters. Consistent with the recommended measures listed in Section 3.9.3, the Project team would maintain communication and work together with the local community, including any canoe clubs or other groups that utilize Molokai Yacht Club as well as the*

nearby shoreline and nearshore waters, to schedule and conduct construction in a manner that minimizes disruption of their regular activities. A complete list of the measures that would be implemented to avoid and minimize impacts to cultural resources and traditional and customary practices is provided in Section 3.9.3.

Infrastructure

Goal: Molokai will have a robust, resilient, and reliable telecommunications network that will meet the growing demands of education, healthcare, residents, and businesses.

Policies

2. Encourage and support the expansion of high-speed internet services.
3. Support the provision of high-speed internet services to all schools.
4. Encourage increased (working from home) activities for residents.

Discussion: *The Project would provide the island of Molokai with robust middle mile broadband infrastructure, which would significantly increase the capacity and reliability of high-speed internet access. This critical infrastructure would meet the growing demands related to education, healthcare, business, telework, and other resident needs.*

Parks and Recreation

Goal: Molokai will have a full range of public facilities, recreational opportunities, and programs that meet the current and future needs of the island's residents and visitors.

Policies

5. Ensure access to the island's parks, trail systems, open spaces, shoreline, and cultural sites, where appropriate, and with government agencies working with private landowners to address issues of liability.

Discussion: *During construction, a portion of the property used by Molokai Yacht Club would be temporarily used for equipment staging and construction activities. This area would be cordoned off for public safety purposes; however, the remainder of the property, including all shoreline areas, would continue to the accessible to the public. Similarly, during HDD and cable laying activities, nearshore waters would remain open for all ocean-based activities throughout Project construction, with monitoring and a buffer around active work zones to maintain public safety. Advanced notice of the work would be communicated to the public through the appropriate channels. Once installed, all cable landfall infrastructure would be located at or beneath the ground surface and would have no bearing on recreational activities or other public access.*

Community Plan Land Use Map

Based on the Molokai Island Community Plan Land Use Map, the Project would be within an area designated as Public/Quasi-Public, which is defined to include public utilities. As the Project would provide a critical utility for the island of Molokai, it would be consistent with the Community Plan land use designations.

5.5.1.5 Lānaʻi Community Plan

The Lanai Community Plan, which represents one of Maui County's nine community plan areas, was initially adopted in 1983 and first updated in 1998. The plan was most recently updated and adopted by the Maui County Council on July 26, 2016 (County of Maui 2016). The plan identifies current and anticipated future conditions and needs, and lays out strategic planning goals, policies, and actions to guide decision-making through 2035. The Project would comply with all applicable goals and policies, as further discussed below.

Environment and Natural Resources

Goal: Lanai's environment and natural resources will be protected, restored, and preserved for future generations.

Policies

3. Protect and restore biodiversity native habitats and native plant and animal species through conservation land management education and control of invasive species.
5. Protect and restore, where appropriate, Lanai's coastal resources and water quality by implementing BMPs for surface water and sediment management, including the use of green infrastructure.
6. Support the Manele-Hulopoe Marine Life Conservation District.

Discussion: *The Project would involve installation of subsea cable to provide critical broadband infrastructure for Maui. The cable, with a maximum diameter of approximately 1.1 inches, would have a minimal footprint and would be surface laid on the ocean floor. A variety of existing and Project-specific data were used to inform the cable routing, to avoid areas with rugged or hard bottom habitat which could support more biological complexity. In addition, HDD would be used to install underground conduit beneath the shoreline to accommodate cable landfall while avoiding and minimizing impacts to sensitive environmental resources along the shoreline. While the cable would traverse the Mānele-Hulopoʻe MLCD, dive surveys were conducted and used to site the HDD punchout point and nearshore cable route in areas comprised entirely of sandy substrate. As evidenced in other similar locations, it is expected that the cable would self-bury in the soft substrate soon after installation. A robust set of BMPs and other measures would be implemented as part of the Project to avoid and minimize impacts to natural resources (see Sections 3.6.2 and 3.7.2). Once installed, the cable landfall infrastructure would be located at or below ground and would not affect any environmental resources.*

Hazard Mitigation

Goal: Lanai will be prepared for natural disasters.

Policies

3. Encourage economic diversity, environmental health, infrastructure maintenance, and hazard preparedness to improve the community's resiliency.
4. Locate critical infrastructure outside of areas projected to become evacuation and inundation zones as sea levels continue to rise.

7. Require shoreline developments to analyze shoreline hazards, including sea level rise during the entitlement and permitting process.

Discussion: *The Project would not include any infrastructure within the mapped sea level rise exposure area, beyond the underground HDD conduit, which would be installed approximately 45-50 feet under the shoreline. The cable landfall infrastructure is designed and built for the marine environment and thus would be resilient to any coastal flooding. Although unlikely to be required, measures to address impacts associated with inundation or erosion would be implemented as needed. As the Project is a shoreline-dependent activity, incorporates a design that is resilient and responsive to sea level rise, and would monitor and mitigate any potential issues, it would be consistent with the Lanai Community Plan objective and policies related to hazard mitigation.*

Cultural, Historic, and Scenic Resources

Goal: Lanai's diverse cultural, archaeological, and historic resources and practices, and scenic resources will be protected for future generations.

Policies

2. Protect all of Lanai's significant archaeological sites and historic and cultural resources.
7. Support access for subsistence hunting fishing and gathering.
8. Support the protection of native Hawaiian rights customarily and traditionally exercised for subsistence cultural and religious purposes in accordance with Article XII Section 7 Hawai'i State Constitution and Hawai'i law.
9. Require developments to mitigate their impacts on historic cultural natural and scenic resources.
10. Protect scenic roadway views and significant view corridors and viewsheds. Protect significant views of ridgelines and hill slopes to maintain open space scenic character.

Discussion: *As part of the due diligence process for the Project, an LRFI was conducted to identify and document historic properties within the Project Area. This effort included archival research, a review of previous archaeological studies, and a pedestrian survey; two potential historic properties were identified within the Project Area for the Lanai cable landing site as part of the LRFI, both likely related to post-Contact ranching activities. In addition, a CIA and Ka Pa'akai Analysis was also conducted to assess potential impacts of the Project on cultural resources as well as traditional and customary practices. The key concern identified through community consultation is the known presence of iwi kūpuna in the vicinity and the potential for the Project to encounter iwi kūpuna. Consultation is ongoing in accordance with both state and federal historic preservation requirements and will be completed prior to Project implementation. Through this process, an AIS including subsurface testing will be conducted within the Project Area; the subsurface testing strategy, which will specifically address the potential occurrence of iwi kūpuna, will be developed in consultation with cultural descendants and subject to approval by SHPD. All mitigation measures identified by SHPD through this process would be implemented as part of the Project. Furthermore, consistent with the recommended measures summarized in Section 3.9.3, a Project-specific archaeological monitoring plan would be developed, as well as communications protocols, immediate protective treatment measures, and cultural protocols that would be implemented*

in the event of an inadvertent discovery. In addition to appropriately addressing all relevant historic and cultural resources, once constructed, the Project would also only involve underground infrastructure such that no public views or vistas would be affected.

Economic Development

Goal: A stable sustainable and diverse economy that is consistent and compatible with Lanai's rural island lifestyle.

Policies

1. Support diversification of Lanai's economy.

9. Support community education and business development by developing state of the art information and communication technology infrastructure.

Discussion: *The Project involves installation of a subsea fiber optic cable system to distribute broadband to the six main Hawaiian Islands, including Lānaʻi. Fiber optic cable systems are currently the most robust and feasible method for high-speed transmission and distribution of data and provide an estimated 95 percent of the world's internet communications. The State of Hawaiʻi recognizes broadband as foundational to Hawaiʻi's economic future and, as importantly, the quality of life of its residents (DBEDT 2020). The Project would provide critical broadband infrastructure to support growth and diversification of all manners of business, as well as support healthcare, education, research, public service, and personal uses. As such, the Project would be directly responsive to the Lanai Community Plan objective and policies related to economic development and state of the art information technology infrastructure.*

Infrastructure and Utilities – Telecommunications

Goal: Lanai will have a current, comprehensive, and reliable telecommunications network.

Policies

1. Improve existing telecommunications services on Lanai using fiber optic communication technologies to provide high-capacity, high-speed internet, and telephone services to residents and businesses as well as educational, social, and health care facilities.

Discussion: *As noted above, the purpose of the Project is to develop an interisland fiber optic cable system with diverse and strategically located cable landing sites to provide the middle mile infrastructure needed for robust and reliable broadband across the state, thereby supporting access to high-speed internet for businesses, educational and health care facilities, and other needs across Lanai. The subsea cable system would be sufficiently robust to support all manners of telecommunications and would provide critical infrastructure to meet current and future projected telecommunication needs.*

Community Plan Land Use Map

Based on the Lanai Community Plan Land Use Map, the Project would primarily be within the state conservation district, which does not have a corresponding community plan land use designation. The remaining portion of the Project Area is within an area designated on the land use map as Project District, which includes a variety of land uses and development standards established by the Project

District zoning ordinance. Uses and standards for the Manele Project District are provided in the Maui County Code (MCC) Chapter 19.70; compliance with these requirements is addressed below.

5.5.2 Zoning Ordinance

Maui County's zoning ordinance (MCC Chapter 19) regulates land use by identifying the uses that are considered appropriate in each zoning district and the minimum standards and conditions that must be met if those uses are to be permitted. The purpose of the ordinance is to regulate the use of land in a manner that encourages orderly development in accordance with the land use directives established by state law, the revised charter of the County of Maui, as amended, and general plan and the community plans of the county.

The Project's cable landing sites on Maui, Molokai, and Lānaʻi would be subject to regulation pursuant to MCC Chapter 19. As the Project would include facilities that provide telecommunication utility service for public benefit, and given the state's involvement, the Project is generally expected to meet the definition of "premises used by the federal, state, or county government for public purposes" or "public use." Based on this assessment, the Project is generally expected to be a permitted use at each cable landing site, as further discussed below.

5.5.2.1 Maui Cable Landing Site

Based on the zoning districts established under the MCC, the HDD, BMH and most of the underground conduit for the terrestrial cable would fall within the state conservation district, which is not within the county's jurisdiction. The remainder of the underground conduit for the terrestrial cable would traverse the Residential (R-2), Road, and Park (PK) zoning districts. The CLS would fall entirely within the Residential (R-2) zoning district (Figure 16.3).

Within the Residential (R-2) zoning district, it is anticipated that the Project infrastructure (CLS and underground conduit for terrestrial cable) would be a permitted use as "buildings or premises used by the federal, state, or county governments for public purposes," pursuant to MCC Chapter 19.08.020. Within the Park (P) zoning district, it is anticipated that the Project infrastructure (underground conduit for terrestrial cable) would be a permitted use as "other similar businesses or commercial enterprises or activities that are not detrimental to the welfare of the surrounding area," pursuant to MCC 19.27A.030. Development standards relevant to these zoning districts are listed in MCC Chapter 19.08.040 and Chapter 19.27A.060 (respectively); these include minimum lot area, minimum lot width, maximum building height, and setback lines. The Project would comply with all applicable development standards.

5.5.2.2 Molokai Cable Landing Site

Based on the zoning districts established under the MCC, the cable landfall infrastructure (HDD, BMH and underground conduit for terrestrial cable) would fall within the Interim zoning district. Based on Ordinance 5656, the Molokai Education Center property was rezoned in 2024 to be within the Public/Quasi-Public (P-1) zoning district; the CLS would fall entirely within this zoning district (Figure 16.4).

Within the Interim zoning district, it is anticipated that the cable landfall infrastructure would be permitted as a "public utility use," pursuant to MCC Chapter 19.02A.030. Within the Public-Quasi-

Public (P-1) zoning district, it is anticipated that the CLS would be a permitted use as a "public facility or public use," pursuant to MCC 19.31.020. Development standards relevant to these zoning districts are listed in MCC Chapter 19.02A.030 and Chapter 19.31.050 (respectively); these include minimum lot area, minimum lot width, maximum building height, and setback lines. The Project would comply with all applicable development standards.

5.5.2.3 Lānaʻi Cable Landing Site

Based on the zoning districts established under the MCC, the entire Project Area for the Lānaʻi cable landing site falls within the Mānele Project District (Figure 16.5). While most of the Project infrastructure would be within the state conservation district, which is not within the county's jurisdiction, it is still understood to be generally subject to Project District regulations.

MCC Chapter 19.70 specifies the land uses and appliable standards within the Mānele Project District. As shown on Figure 17, the Project Area is primarily within the Commercial Subdistrict as well as the Open Space Subdistrict of the Mānele Project District. It is anticipated that the cable landfall infrastructure would be permitted within the Commercial Subdistrict as a "building or premise utilized by the federal, state, or county governments which will not be hazardous or a nuisance to the surrounding area" per MCC 19.70.040.A.2, and as a "utility within the Open Space Subdistrict (per MCC 19.70.070.A.1.a).

Development standards relevant to these subdistricts are listed in MCC Chapter 19.70.040.C and Chapter 19.70.070.B, respectively; general standards of development within the Mānele Project District are listed in MCC Chapter 19.70.100. The Project would comply with all applicable development standards.

5.5.3 Special Management Area

As authorized by HRS Chapter 205A, the County of Maui regulates all land uses and activities that qualify as development within the SMA to preserve, protect, and whenever possible, restore the natural resources of the coastal zone; Maui County has delegated its authority to establish rules for the SMA to the Maui Planning Commission, Molokai Planning Commission, and Lānaʻi Planning Commission for each respective island. All three cable landing sites within the County of Maui fall within the SMA (with the exception of the Molokai CLS), as shown on Figures 16.3 through 16.5. The anticipated SMA requirements for the cable landing site on each island are further discussed below.

5.5.3.1 Maui Cable Landing Site

The SMA on Maui is regulated under rules established by the Maui Planning Commission, which are codified in Title 12, Chapter 202 of the Maui County Administrative Rules (Maui SMA Rules). As the cable landfall infrastructure would constitute development and would be valued at greater than $500,000, an SMA Use Permit would be required for the Maui cable landing site. The permit procedures for an SMA Use Permit are detailed in Section 12-202-15 of the Maui SMA Rules; following submittal and acceptance of a permit application, an SMA Use Permit requires a public hearing and approval by the Maui Planning Commission. As described in Section 12-202-10 of the Maui SMA Rules, the objectives and policies for development within the SMA are the same as those contained in HRS Section 205A-2; consistency with these objectives and policies is addressed in Section 5.2.4.

5.5.3.2 Molokai Cable Landing Site

The SMA on Molokai is regulated under rules established by the Molokai Planning Commission, which are codified in Title 12, Chapter 302 of the Maui County Administrative Rules (Molokai SMA Rules). As noted above, the cable landfall infrastructure would constitute development and would be valued at greater than $500,000; as such, an SMA Use Permit would be required for the Maui cable landfall. The permit procedures for an SMA Use Permit are detailed in Section 12-302-15 of the Maui SMA Rules; following submittal and acceptance of a permit application, an SMA Use Permit requires a public hearing and approval by the Molokai Planning Commission. As described in Sections 12-302-10 and 12-302-11 of the Molokai SMA Rules, the objectives, policies, and guidelines for development within the SMA are the same as those contained in HRS Section 205A-2 and Section 205A-26; consistency with these objectives, policies, and guidelines is addressed in Section 5.2.4.

5.5.3.3 Lānaʻi Cable Landing Site

The SMA on Lānaʻi is regulated under rules established by the Lānaʻi Planning Commission, which are codified in Title 12, Chapter 402 of the Maui County Administrative Rules (Lānaʻi SMA Rules). However, based on information provided by Maui County, it is understood that planning, design, construction, operation, and maintenance of lands or facilities within DOBOR jurisdiction are not subject to SMA permitting requirements, pursuant to HRS Chapter 171-6(19). As the Lānaʻi cable landing site falls within the Mānele Small Boat Harbor, which is under DOBOR jurisdiction, an SMA permit is not expected to be required for the proposed facilities. This conclusion would be further validated through the permitting process.

5.5.4 Shoreline Setback

Pursuant to HRS Chapter 205A-43, the County of Maui has established minimum shoreline setback requirements. Similar to regulation within the SMA, Maui County has delegated its authority to establish rules for the shoreline area to the Maui Planning Commission, Molokai Planning Commission, and Lānaʻi Planning Commission for each respective island. Each of these rules establish a shoreline setback line and regulate uses within the associated shoreline setback area, with a mechanism to grant a variance from the shoreline setback requirements if certain conditions are met. Following is a discussion of the applicable rules for the cable landing site on each island in Maui County.

5.5.4.1 Maui Cable Landing Site

Title 12, Chapter 203 of the Maui County Administrative Rules provide the Shoreline Rules for the Maui Planning Commission. Section 12-203-2 specifies the purpose of the rules is to protect the safety and welfare of the public by providing protection from coastal natural hazards; and to ensure that the public use and enjoyment of our coastal resources are preserved and protected for future generations in accordance with HRS Chapter 205A. These rules generally prohibit any structure or activity within the designated shoreline setback area (i.e. all land area between the shoreline and shoreline setback line) that are not explicitly permitted. Pursuant to Section 12-203-6(3), for lots without a mapped Erosion Hazard Line (EHL), the shoreline setback line is either 200 feet from the shoreline (as mapped by the Planning Department), or if the shoreline is established by certified shoreline survey, then the

shoreline setback line is calculated based on the lot's shape and depth, ranging between 40 to 150 feet from the shoreline.

A shoreline survey has been completed and an application for shoreline certification will be submitted to the DLNR Land Division. Based on the surveyed shoreline and anticipated shoreline setback distance, the BMH would be approximately 205 feet inland of the surveyed shoreline. The only Project components within the shoreline setback would be the two HDD conduits that would traverse underground (see Figure 16.3); as shown on the preliminary HDD profiles, the conduit depths at the shoreline are expected to be approximately 50-55 feet and 80-85 feet below the ground surface, respectively. Pursuant to Section 12-203-15 of the Shoreline Rules for the Maui Planning Commission, a variance may be granted for a structure or activities that meet the following criteria (among others): (6) facilities or improvements by public agencies or public utilities regulated under HRS Chapter 269; or (7) private facilities or improvements that are clearly in the public interest.

5.5.4.2 Molokai Cable Landing Site

The Rules of the Molokai Planning Commission Relating to the Shoreline Area of the Island of Molokai are codified in Title 12, Chapter 304 of the Maui County Administrative Rules. Section 12-304-3 specifies that the purpose of the rules is to establish the shoreline area in order to protect the health, safety, and welfare of the public. These rules generally prohibit any structure or activity within the designated shoreline setback area (i.e. all land area between the shoreline and shoreline setback line) that are not explicitly permitted. Pursuant to Section 12-304-6(a)(3), a lot with an average lot depth greater than 160 feet shall have a shoreline setback line either at 150 feet from the shoreline or at the distance from the shoreline calculated by multiplying the average lot depth of the lot by 0.25 (whichever is lesser).

A shoreline survey has been completed and an application for shoreline certification was submitted to the DLNR Land Division on September 8, 2025. Based on the surveyed shoreline and anticipated shoreline setback distance, the BMH would be approximately 200 feet inland of the surveyed shoreline. The only Project components within the shoreline setback would be the underground HDD conduit (see Figure 16.4); as shown on the preliminary HDD profile, the conduit depth at the shoreline is expected to be approximately 35-40 feet below the ground surface. Pursuant to Section 12-304-13 of the Rules of the Molokai Planning Commission Relating to the Shoreline Area of the Island of Molokai, a variance may be granted for a structure or activities that meet the following criteria (among others): (6) facilities or improvements by public agencies or public utilities regulated under HRS Chapter 269; or (7) private facilities or improvements that are clearly in the public interest.

5.5.4.3 Lānaʻi Cable Landing Site

The purpose of the Shoreline Setback Rules and Regulations for the Lānaʻi Planning Commission, which are codified in Title 12, Chapter 403 of the Maui County Administrative Rules, is to establish the shoreline area in order to protect the health, safety, and welfare of the public. These rules generally prohibit any structure or activity within the designated shoreline setback area (i.e. all land area between the shoreline and shoreline setback line) that are not explicitly permitted. Pursuant to Section 12-403-10(a)(3), a lot with an average lot depth greater than 160 feet shall have a shoreline

setback line either at 150 feet from the shoreline or at the distance from the shoreline calculated by multiplying the average lot depth of the lot by 0.25 (whichever is lesser).

A shoreline survey has been completed and an application for shoreline certification will be submitted to the DLNR Land Division. Based on the surveyed shoreline and anticipated shoreline setback distance, the BMH would be approximately 139 feet inland of the surveyed shoreline. The only Project components within shoreline setback would be the HDD conduit that would traverse under the shoreline (see Figure 16.5); as shown on the preliminary HDD profile, the conduit depth at the shoreline is expected to be approximately 45-50 feet below the ground surface. However, as discussed above with regards to the SMA requirements, Maui County has indicated that planning, design, construction, operation, and maintenance of lands or facilities within areas of DOBOR jurisdiction are similarly not subject to shoreline setback requirements. As the Lānaʻi cable landing site falls within the Mānele Small Boat Harbor, which is under DOBOR jurisdiction, a shoreline setback variance is not expected to be required for the proposed facilities. This conclusion would be further validated through the permitting process.

5.6 Hawaiʻi County

5.6.1 Hawaiʻi County General Plan

The Hawaiʻi General Plan is a policy document for the long-range comprehensive development of the Island of Hawaiʻi and provides direction for future growth of the county. The most recent Hawaiʻi General Plan was approved by the County Council and became effective on February 9, 2005. Through a multi-phase update process, the county has prepared an updated version of plan: Hawaiʻi County General Plan 2045. The following discussion of general plan compliance is based on the Final Recommended Draft of the Hawaiʻi County General Plan 2045, which has been transmitted to the county council for review and decision-making (Hawaiʻi County 2024).

The Hawaiʻi County General Plan 2045 includes key themes and goals related to cultural and natural resource protection, sustainable growth and development, maintenance and enhancement of critical infrastructure, public health and safety, recreation and open space, housing, and economic development. Overall, the Project is consistent with the various objectives and policies presented in the Hawaiʻi County General Plan 2045. As further discussed below, the Project would directly support or otherwise not conflict with objectives and policies related to (1) collaborative biocultural stewardship, (2) addressing climate change for island-wide health, (3) sustainable development, including land use and public utilities, and (4) a thriving, diversified and regenerative economy. While the Project would not directly relate to the objectives and policies for the other key areas addressed in the plan, such as those related to transportation, public facilities and services, and housing, it would indirectly benefit many of these goals by providing critical broadband infrastructure necessary for functionality of these areas (e.g., improved access for education and training, providing for health-care needs, etc.).

Collaborative Biocultural Stewardship

Goal: Natural and cultural resources are thriving and sustainably managed, preserved, and restored to maintain our unique and diverse environment

Objective 1 – Increase the biodiversity and resilience of native habitats.

Policy 1.1: Minimize and mitigate significant impacts, such as degradation, incompatible uses, or other threats, to Native Hawaiian habitats and public trust resources.

Policy 1.3: Encourage the preservation and restoration of natural landscape features, such as reefs, beaches and dunes, forests, rangelands, streams, floodplains, wetlands, and aquifer recharge areas that have the inherent capacity to prevent, minimize, or mitigate the impacts of climate change.

Policy 1.4: Maintain the shoreline for recreational, cultural, educational, and/or scientific uses in a manner that is protective and respectful of resources and is of the maximum benefit to the general public.

Policy 1.6: Encourage the preservation of native vegetation and open space during development activities.

Policy 1.9: Limit the introduction and establishment of invasive species.

Policy 1.15: Any development will not adversely impact the following resource asset(s): (c) shoreline setback areas, beaches, and dunes.

Policy 1.16: Maintain shoreline setback to protect: (a) natural shoreline vegetation, (b) marine turtle nesting beaches/areas; (c) nearshore water quality; (d) structures from the effects of long-term sea level rise; and (e) beaches and shorelines from erosion.

Discussion: *HDD would be used to install underground conduit beneath the shoreline to accommodate cable installation while avoiding and minimizing impacts to both the shoreline and existing wastewater pipelines. Due diligence studies of benthic marine resources were conducted and used to inform siting of the HDD punchout point and associated cable route to avoid areas known to support corals to the extent practicable. Where it is not possible for the cable route to entirely avoid areas with coral, the cable would be hand-placed by divers in existing sand channels to minimize impacts. The Project is not expected to result in the permanent loss of any corals; as evidenced by subsea cable systems in other similar locations, it is expected that any impacted corals would recolonize (including the cable itself). While the anticipated impacts are not expected to be significant, the Project would incorporate efforts to provide benefits related to the coastal environment within or near the Project Area as a means to offset the effects of the cable installation; this effort would be coordinated with the resource agencies, with input from the community as appropriate, through the permitting process.*

The BMH and other onshore Project components have been sited inland of the shoreline setback area in an area that is not expected to be subject to sea level rise; only the HDD conduit, which would be installed under the shoreline, would be within the setback area. During construction, a portion of the PACRC facility would be temporarily used for equipment staging and construction activities; public access along the shoreline would be maintained for the duration of construction. Following construction, all cable landfall infrastructure would be located below ground and would not diminish any existing open space areas. The CLS facility, which would house equipment for operation and maintenance of the fiber optic cables, would be a modular structure located within the UH Hilo campus. Measures to avoid and minimize the introduction or spread of invasive species would be implemented. For these reasons,

the Project is expected to be consistent with the Hawai‘i County General Plan objective and policies related to native habitats.

Objective 3 - Increase direct community restoration and collaborative efforts to conserve and nourish the island’s biocultural resources.

Policy 3.4: Promote and protect traditional exercised rights and customs of Native Hawaiians.

Discussion: *As discussed in Section 3.9, a CIA and Ka Pa‘akai Analysis was conducted to assess potential impacts of the Project on cultural resources as well as traditional and customary practices. The concerns and potential impacts identified through this process have been considered in the Project development process and will be further addressed through implementation of measures to avoid and minimize impacts to cultural resources and traditional and customary practices as listed in Section 3.9.3. With implementation of these measures, the Project is not expected to significantly impact traditional cultural resources or practices.*

Objective 4 – The historical integrity, character, scenic assets, and open spaces of our communities are protected, restored, and treated as unique assets with significant social and economic value and managed in perpetuity.

Policy 4.1: Require public and private developers to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.

Discussion: *As detailed in Section 3.8, an LRFI was conducted to identify and document historic properties within the Project Area. Based on consultation with SHPD, an AIS including subsurface testing is being completed. State and federal historic preservation requirements will be fulfilled prior to Project implementation, with all mitigation measures identified by SHPD implemented as part of the Project. In addition, a CIA and Ka Pa‘akai Analysis was conducted to assess potential impacts of the Project on cultural resources as well as traditional and customary practices. Recommendations identified through the CIA and Ka Pa‘akai Analysis to avoid and minimize impacts to cultural resources and practices would also be implemented as part of the Project, as detailed in Section 3.9.3.3. As such, due diligence efforts conducted for the Project support the above-referenced objective and policy of the Hawai‘i County General Plan.*

Objective 5 - Protect, restore, and enhance our communities’ unique scenic character.

Policy 5.3: Protect the views of areas endowed with natural beauty by carefully considering the effects of proposed construction and compatibility during all land use reviews.

Discussion: *The Project would result in short-term visual effects as a result of construction activities and the presence of equipment and crews within the Project Area. However, following construction, all cable landfall infrastructure located at PACRC would be located underground; the CLS structure would be visible only from within the UH Hilo campus. As such, the Project would not adversely affect any of the natural beauty sites identified in the general plan (e.g., Leleiwi Park shoreline) or the overall scenic character of Hilo.*

Addressing Climate Change for Island-Wide Health

Goal: Ensure a just transition to a climate resilient island by addressing the causes and impacts of climate change through incorporating equitable climate mitigation and adaptation priorities into policies, programs, infrastructure, and decision-making.

Objective 8 - Improve the identification of climate change threats, assessment of potential consequences, and evaluation of adaptation options.

> Policy 8.8: Develop adaptation strategies (e.g., protection, accommodation, managed retreat, and preservation) for capital improvements to ensure that the project's useful life and service expectations can be met in the face of projected climate change impacts.

Discussion: *The Project would not include any infrastructure within the mapped sea level rise exposure area, beyond the HDD conduit installed under the shoreline. The HDD conduit, which would be installed approximately 75-80 feet under the shoreline, is designed and built for the marine environment and thus would be resilient to any coastal flooding.*

Sustainable Development & Resilient Communities: Land Use

Goal: We strategically apply progressive land use strategies incorporating indigenous and contemporary knowledge and place-based practices to direct and manage growth for the health and safety of our communities.

Objective 9 - Maintain community character and land use compatibility.

> Policy 9.1: The development of commercial facilities should be designed to reflect the character of the community while providing desired services and mitigating impacts on the surrounding environment.

Discussion: *The Project would entail construction of a subsea fiber optic cable to provide critical broadband infrastructure for businesses and residents across the state. As detailed throughout this document, the Project has been designed and would be constructed in a manner that avoids, minimizes, and mitigates potential impacts to the surrounding environment to the extent practicable. The cable landfall infrastructure would be installed entirely below ground and would not be visible. The CLS facility would be a small modular structure located within the UH Hilo campus and would be designed to be visually consistent with existing campus architecture. For these reasons, the Project would maintain community character and would be compatible with existing land uses.*

Objective 10 – Increase the integration of natural systems planning.

> Policy 10.1: Protect and enhance Hawaii's beaches, shoreline, open spaces, and scenic resources.

Discussion: *The Project incorporates the use of HDD to install underground conduit between the nearshore waters and cable landing site, thus avoiding impacts to the shoreline. Once installed, the cable landfall would be located entirely underground and temporarily disturbed areas would be returned to their pre-existing condition such that the Project would not affect open space or scenic resources.*

Objective 12 - Reduce the threat to life and property from natural hazards and disasters.

Policy 12.3: Consider natural hazards in all land use planning and permitting.

Discussion: *While it is not possible for the Project to avoid placement of cable landfall infrastructure within the coastal flood hazard zone and tsunami evacuation zone, this infrastructure would be installed underground; furthermore, these types of systems are designed and built for the marine environment such that they can withstand potential inundation. The CLS facility has been sited outside of the flood hazard and tsunami evacuation zone. It would be designed and constructed in compliance with all applicable state and local building codes and requirements. As such, the Project is expected to be resilient to natural hazards, including flooding, tsunamis, hurricanes, and earthquakes.*

Sustainable Development & Resilient Communities: Public Utilities

Goal: Our communities are adequately served by sustainable and efficient public infrastructure, utilities, and services based on existing and future growth needs, sound design principles, and effective maintenance practices.

Objective 30 - Advance policies, programs, and initiatives for public and/or private investment in broadband and telecommunications infrastructure.

Policy 30.1: Treat broadband access as a basic utility that is available to all communities.

Policy 30.6: Support projects that address service gaps in Hawai‘i’s broadband infrastructure.

Policy 30.8: Promote and incentivize the landing of transpacific submarine fiber optic cables.

Policy 30.9: Alleviate barriers and assist broadband projects with navigating through the regulatory permitting process.

Policy 3.11: Advocate for service diversity, redundant network capacity, and provide improved communications to outlying rural areas and other underserved or unserved communities.

Action 30.d Collaborate with government, private and nonprofit agencies, communities, and other stakeholders to seek funding, identify and remove regulatory barriers to complete and improve the island’s fiber optic loop in an environmentally and economically appropriate manner.

Action 30.f Collaborate with government, private and nonprofit agencies, communities, and other stakeholders to progressively improve broadband speeds to keep pace with technological advances.

Action 30.k Seek federal and other opportunities for the funding of broadband infrastructure.

Action 30.m Foster public-private partnerships to support the development and expansion of broadband infrastructure, including community networks.

Discussion: *As stated in the Final Recommended Draft of the Hawai‘i County General Plan 2045, “broadband is foundational to economic development, job creation, global competition, and the ability to engage in society. Similar to the way electricity revolutionized life around the world, broadband is fueling entire new industries and generating innovative solutions for accessing, organizing, and sharing information. Broadband as a public utility plays a vital role in accessing and providing education and health services, managing energy, preserving public safety, and engaging with the government”*

(Hawai'i County 2024). The Project would directly support the general plan objectives and policies related to broadband infrastructure by leveraging federal funds to build middle mile infrastructure that would provide increased broadband capacity and reliability to meet both current and future projected demand for Hawai'i Island. The Project would complement efforts by other parties that are working to provide first and last mile infrastructure to ensure that all of Hawai'i's residents have access to high-speed broadband, including currently unserved and underserved areas.

Thriving, Diversified, & Regenerative Economy

Goal: Our economy is diverse, regenerative, and innovative, improving and maintaining the financial well-being of our residents with a focus on increasing local economic opportunities.

Objective 45 - Incorporate resiliency, diversity, and innovation in County programs, plans, and research to support healthy economic development and revitalization.

Policy 45.8: Provide technological infrastructure that increases the competitiveness of businesses and allows them to thrive in all parts of the island.

Policy 45.12: Continue to encourage the research, development, and implementation of advanced technologies and processes.

Action 45.a Collaborate with emerging industry leaders to identify needed infrastructure and services to support economic diversification.

Discussion: *The Final Recommended Draft of the Hawai'i County General Plan 2045 specifically identifies increased broadband infrastructure to facilitate participation in the digital economy as an opportunity (Hawai'i County 2024). By providing broadband infrastructure that meets the island's current and projected future demand for high-speed internet, the Project would be directly responsive to the plan objectives and policies related to supporting economic development and diversification.*

General Plan Land Use Map

The County of Hawai'i General Plan 2045 includes a Land Use Map which identified designated land uses across the county. The land uses are broad, flexible designations intended to guide the direction and quality of future developments in a coordinated and rational manner.

Based on the Land Use Map, the proposed cable landfall at PACRC would be in an area designated as Recreation, which include parks, open space, and other recreational areas, such as golf courses, and shoreline setback areas not already in the state conservation land use district. As described throughout Section 2, the infrastructure associated with the cable landfall would be located entirely underground, and as such would be compatible with open space uses within this portion of the Project Area. The CLS at UH Hilo would be in an area designated on the Land Use Map as University, which includes public university, ancillary public uses, residential, and support commercial uses. The CLS would be compatible with UH Hilo's existing campus infrastructure and would serve an ancillary public use, by providing an improved broadband system for Hawai'i Island. For these reasons, the proposed Project is consistent with the County of Hawai'i General Plan 2045 Land Use Map.

5.6.2 Hilo Development Plan

The Hilo Community Development Plan was prepared and adopted in 1971, as part of the implementation of the county general plan. The Hilo Community Development Plan is based on the

goals, policies, and standards identified in the county general plan, and is intended to provide a framework for long-range planning and decision making for Hilo (County of Hawai‘i 1971). The plan establishes a vision for future growth by identifying policies related to the type and location of future development, with a focus on the economic, social, and environmental needs to create a desirable future lifestyle for the residents of Hilo. To achieve this vision, the plan presents guiding principles that are the foundation for recommendations related to natural resources and shoreline, economics, land use, transportation, housing, public facilities, recreation, historic sites, public utilities, flood control and drainage, natural beauty and urban form, and environmental quality. Consistency with the applicable recommendations is discussed below.

More recent community planning efforts have addressed various area around Hilo including the Downtown Hilo Multimodal Master Plan (2018) and Envision Downtown Hilo 2025 (2011). The Project does not fall within the area covered by either of these plans.

Natural Resources and Shoreline

Natural Resources: Areas necessary for the protection and propagation of specified endangered native wildlife, and conservation for natural ecosystems of endemic plants, fish, and wildlife.

- In the interim and until studies are completed, there should be evaluation of the impact that each proposed public or private development would have on the wildlife and ecosystems in the area of development.

The installation of utility facilities, highways and related public improvements in natural and wildland areas should avoid the contamination or despoilment of natural resources by design review, conservation principles, and by mutual agreement between the County and affected agencies.

- In each element of this plan in which public facilities are recommended, they are located with the objective of causing the least disturbance to the natural environment within acceptable cost limitations. Areas of potential agency coordination are also indicated.

Shoreline: In addition to the specific shoreline plan, the following is recommended:

- The County should undertake studies to identify and locate the habitats of plants, fish and other life in the littoral zone so that the impact of any proposed shoreline development on the ecosystem can be evaluated.

Discussion: *HDD would be used to install underground conduit beneath the shoreline to accommodate cable installation while avoiding and minimizing impacts to the shoreline. Dive surveys were conducted to inventory the marine benthic resources and the results were used to inform siting of the HDD punchout point and associated cable route to avoid corals to the extent practicable. While it is not possible for the cable route to entirely avoid areas with coral, the cable would be hand-placed by divers in existing sand channels to minimize impacts. Similarly, terrestrial biological surveys were conducted to characterize the species and habitats present, and to determine whether federally or state listed threatened or endangered species have the potential to occur. The results of these surveys, an assessment of potential impacts, and measures that would be implemented to avoid, minimize, and mitigate potential impacts to marine and terrestrial biological resources are further discussion in Sections 3.6 and 3.7.*

Economic Element and Demographic Analysis

The Hilo Plan expected that Hilo would continue to be the major urban center on the Big Island despite dispersion of some activities to other parts of the County.

Development Program

- There should be provision of efficient and economical utility systems, such as electric power, water supply and sewerage, to serve industrial areas, and an efficient fuel distribution system from the harbor to the industrial areas.

Discussion: *Although not specifically identified in the Hilo Development Plan, broadband is now considered a critical utility for both businesses and residents. The Project would build middle mile infrastructure that would provide increased broadband capacity and reliability to meet both current and future projected demand for Hawai'i Island.*

Land Use

Open Space

- Natural Areas and Reserves Areas along the Keaukaha Coast and the coast south of Leleiwi Point are shown for open space because of their attractive natural appearance, the need to provide access and recreation along this coast, and to protect against potential tsunami inundation.

Discussion: *The Project incorporates the use of HDD to install underground conduit between the nearshore waters and cable landing site, thus avoiding impacts to the shoreline. Once installed, the cable landfall infrastructure would be located entirely underground and temporarily disturbed areas would be returned to their pre-existing condition such that the Project would not affect open space or scenic resources.*

Natural Beauty and Urban Form

Viewpoints and Scenic Corridors

- Shoreline between ʻĀleʻaleʻa Point and Leleiwi Point

Discussion: *During construction, a portion of the PACRC facility would be temporarily used for equipment staging and construction activities. This area would be cordoned off for public safety purposes; however, the shoreline would remain accessible to the public. Although short-term visual effects would occur during construction of the Project due to construction activities and the presence of equipment and crews, all construction equipment will be removed upon completion of installation. Following construction, temporarily disturbed areas would be returned to pre-existing conditions. All Project components would be located at or below ground; the only visual evidence of the cable landfall infrastructure would be an at-grade BMH manhole cover.*

Environmental Quality

The various elements of the Hilo Plan were prepared with the objective of improving the quality of the environment, as well as to achieve other objectives. It is a basic premise of the Hilo Plan that environmental quality can be maintained directly through proper land planning and governmental

controls. Assessment of the environment should be continuous and incorporated into all aspects of the planning process for Hilo.

- To improve and conserve the quality of the air, water and earth resources for the benefit of present and future generations through balanced and integrated planning of the man-made environment in the Hilo urban area.
- To assure for all residents and visitors to Hilo safe, healthful, productive, aesthetically pleasing and culturally satisfying surroundings. To attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.

Discussion: *As detailed throughout this document, detailed due diligence studies have been conducted and the results have been used to inform the Project design and development process, such that the proposed broadband infrastructure is not expected to result in any substantial adverse environmental or ecological effects. BMPs would be implemented to minimize potential impacts to the environment.*

5.6.3 Zoning Code

Hawai‘i County’s zoning code (Hawai‘i County Code [HCC] Chapter 25) regulates and restricts land use by for the purpose of promoting health, safety, morals, or the general welfare of the county. The zoning specifically addresses the height, size of buildings, and other structures, the percentage of a building site that may be occupied, off-street parking, setbacks, size of yards, courts, and other open spaces, the density of population, and the location and use of buildings, structures, and land for trade, industry, residence, or other purposes.

The cable landfall at PACRC is located within the Open (O) and General Industrial (MG-1a) zoning district, and the CLS at UH Hilo is located in the University (UNV) zoning district (Figure 16.6). Pursuant to HCC Section 25-4-11, communication, transmission, and power lines of public and private utilities and governmental agencies are permitted uses within any district. Similarly, public uses, structures, and buildings are permitted uses in any district, with issuance of plan approval. As detailed in HCC Section 25-2-71, plan approval provides a method of allowing closer inspection of certain developments to ensure conformance with the general plan, to assure that the intent and purpose of the zoning code are addressed, and to ensure pertinent conditions of previous approvals related to the development have been implemented.

HCC Section 25-4 (Article 4) of the zoning code identifies the general development standards that must be met for any use or site, irrespective of the zoning district in which it is located; these include height, street frontage, lot areas and widths, and yards and open space. HCC Section 25-5 (Article 5) presents standards for the various zoning districts; in general, these standards include height limit, minimum building site area and width/depth, front and side/rear yards, landscaping, and other district specific regulations. The Project is expected to comply with all development standards.

5.6.4 Special Management Area

As authorized by HRS Chapter 205A, Hawai‘i County regulates all land uses within the SMA for the purpose of preserving, protecting, and where possible, restoring then natural resources of the coastal zone. Regulation within the SMA is governed by the Special Management Area Rule of the County of Hawai‘i (Rule 9). As the cable landfall infrastructure would be located within the SMA (see Figure 16.6)

and would be valued at greater than $500,000, an SMA Use Permit would be required. Section 4 of the County's SMA Rules establish specific guidelines for review and approval of development in the SMA. SMA Use Permits for proposed development in Hilo require approval by the Windward Planning Commission.

Pursuant to Section 9-5 and 9-6 of the SMA Rules, the objective, policies, and guidelines for development within the SMA are the same as those contained in HRS Section 205A-2 and 205A-26; consistency with these objectives, policies, and guidelines is addressed in Section 5.2.4. Furthermore, pursuant to the requirements of Section 9-12, the Project would not involve any floodlights, uplights, spotlights, or other operational lighting within the SMA.

5.6.5 Shoreline Setback

Pursuant to HRS Chapter 205A-43, the County of Hawai'i has established minimum shoreline setback requirements to regulate the use and activities within the shoreline setback area. The criteria and procedures for establishment and enforcement of the shoreline setback line and the review of all activities or structures proposed within the shoreline setback area are set forth in the County of Hawai'i Rules of Practice and Procedure, Rule 11 (Shoreline Setback Rules).

Pursuant to Section 11-5 of the Shoreline Setback Rules, the shoreline setback line shall not be less than 40 feet inland from the shoreline. A shoreline survey has been completed and an application for shoreline certification was submitted to the DLNR Land Division on April 8, 2025. Based on the surveyed shoreline and required shoreline setback distance, the only Project components within shoreline setback would be the HDD conduit that would traverse underground (see Figure 16.6); as shown on the preliminary HDD profile (Appendix C), the conduit depth at the shoreline is expected to be approximately 75-80 feet below the ground surface.

Pursuant to Section 11-6 of the County of Hawai'i's Shoreline Setback Rules, a shoreline setback variance may be granted for an otherwise prohibited structure or activity if it is necessary and ancillary to the uses and activities listed in Planning Commission Rule 8 (Shoreline Setback Variance, Section 8-11). Section 8-11 of Rule 8 in turn specifies that a variance may be granted if the proposed structure or activity meets the public interest standard, which includes (1) facilities or improvements by public agencies or public utilities regulated under HRS Chapter 269; or (2) private facilities or improvements that are clearly in the public interest. A Shoreline Setback Variance requires compliance with HRS Chapter 343, a public hearing, and approval by the Windward or Leeward Planning Commission.

5.7 Anticipated Permits and Approvals

The federal, state, and county permits and approvals that are expected to be required for the Project are presented below in Table 5-2.

Table 5-2. Anticipated Federal, State, and County Permits and Approvals

Permit/Approval	Regulatory Agency
Federal Agency	
Rivers and Harbors Act Section 10, Nationwide Permit (NWP) 57	U.S. Army Corps of Engineers (USACE) Honolulu District
Endangered Species Act (ESA), Section 7 Consultation	National Oceanic and Atmospheric Administration (NOAA) Fisheries and U.S. Fish and Wildlife Service (consultation through USACE NWP process)
National Historic Preservation Act (NHPA), Section 106 Consultation	State Historic Preservation Officer (SHPO (delegated to University of Hawai'i [UH] by USACE)
Magnuson-Stevens Fishery Conservation and Management Act Consultation (including EFH Assessment)	NOAA Fisheries (consultation through USACE NWP process)
State Agency	
Clean Water Act Section 401, Blanket Water Quality Certification	Department of Health (HDOH) Clean Water Branch (confirmed through USACE NWP process)
Coastal Zone Management Act, Federal Consistency Determination (as needed)	Office of Planning and Sustainable Development (through USACE NWP process)
Conservation District Use Permit	Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL), Board of Land and Natural Resources (BLNR)
Grant of Submerged Lands Easement	DLNR Land Division, BLNR
Shoreline Certification (all cable landing sites)	DLNR Land Division
HRS Chapter 6E, Historic Preservation Review	State Historic Preservation Division (SHPD)
License for Easement	DHHL
Use and Occupancy Agreement	Department of Transportation (HDOT) Highways Right-of-Way Branch
NPDES General Permit Coverage	HDOH Clean Water Branch
Permit to Perform Work Upon State Highway	HDOT Highways District Office
Permit to Operate or Transport Oversize and/or Overweight Vehicles and Loads	HDOT Highways District Office
Noise Permit/Variance	HDOH Indoor and Radiological Health Branch, Noise Section
Kaua'i County	
Use Permit/Class IV Zoning Permit	County of Kaua'i Planning Department; Kaua'i Planning Commission
Special Management Area (SMA) Use Permit	County of Kaua'i Planning Department; Kaua'i Planning Commission
Shoreline Setback Variance	County of Kaua'i Planning Department; Kaua'i Planning Commission
Grading and Building Permits (as needed)	County of Kaua'i Department of Public Works
Road Permit	County of Kaua'i Department of Public Works
City and County of Honolulu (O'ahu)	
SMA Major Permit[1/]	City and County of Honolulu Department of Planning and Permitting (DPP), Honolulu City Council
Shoreline Setback Variance[1/]	DPP
Grading and Building Permits (as needed)	DPP
Maui County (Maui Cable Landing Site)	
SMA Use Permit	County of Maui Planning Department, Maui Planning Commission
Shoreline Setback Variance	County of Maui Planning Department, Maui Planning Commission
Grading and Building Permits (as needed)	County of Maui Department of Public Works
Maui County (Molokai Cable Landing Site)	
SMA Use Permit	County of Maui Planning Department, Molokai Planning Commission
Shoreline Setback Variance	County of Maui Planning Department, Molokai Planning Commission

Permit/Approval	Regulatory Agency
Grading and Building Permits (as needed)	County of Maui Department of Public Works
Flood Hazard Permit	County of Maui Department of Public Works
Maui County (Lānaʻi Cable Landing Site)[2]	
Grading and Building Permits (as needed)	County of Maui Department of Public Works
Hawaiʻi County (Hawaiʻi Island Cable Landing Site)	
Plan Approval	Hawaiʻi County Planning Department
SMA Use Permit	Hawaiʻi County Planning Department; Windward Planning Commission
Shoreline Setback Variance	Hawaiʻi County Planning Department; Windward Planning Commission
Grading and Building Permits (as needed)	Hawaiʻi County Public Works Department

1/ In the event that infrastructure constructed as part of the OSCT Project is utilized for the cable landfall, it is anticipated that installation of Project infrastructure would instead require an SMA Minor Permit (and no Shoreline Setback Variance).

2/ As discussed in Sections 5.5.3.3 and 5.5.4.3, Maui County has indicated that planning, design, construction, operation, and maintenance of lands or facilities within areas of DOBOR jurisdiction are not subject to SMA or shoreline setback requirements. As the Lānaʻi cable landing site falls within the Mānele Small Boat Harbor, which is under DOBOR jurisdiction, an SMA and shoreline setback variance is not expected to be required for the proposed facilities. This conclusion would be further validated through the permitting process.

6 STAKEHOLDER ENGAGEMENT AND CONSULTATION

Recognizing the importance of stakeholder input to the permitting and development process, a robust engagement and consultation approach was implemented beginning early in the pre-development stages of the Project. These efforts were specifically designed to (1) educate stakeholders about the critical need for improved broadband infrastructure across the state, (2) introduce and build awareness of the proposed HIFL broadband system, (3) obtain stakeholder input on specific issues and concerns, and (4) generate dialogue to build support for the Project implementation. Based on the geographic spread of the Project and the different needs and concerns of individual communities, the stakeholder engagement approach incorporated a variety of different techniques generally focused on addressing the various stakeholders on a per cable landing site basis, including a range of elected officials, community leaders, neighborhood associations, adjacent landowners, and knowledgeable and interested individuals. Specific techniques include community meetings, individual and small-group meetings, informational presentations, agency consultation meetings, development of a project website (www.hifl.llc) and factsheet, and a dedicated e-mail for receiving input regarding the Project. Other efforts include specific requirements of the environmental review and permitting process, including consultation with regulatory agencies with jurisdiction related to the Project, pre-assessment scoping and public review for the Draft EA, as well as consultation for the CIA and Ka Pa‘akai Analysis, and historic preservation review process. Additional details regarding the specific stakeholder engagement and consultation efforts that have been conducted to date are provided in the following sections.

6.1 Community Meetings

In an effort to broadly communicate with stakeholders relative to the six cable landing sites, at least one community meeting has been held to date on each of the affected islands. The meetings were held in a community meeting space proximate to the cable landing site, and were widely advertised through elected officials, community organizations, and local contacts. Each meeting consisted of a presentation by the Project team as well as a question-and-answer session with attendees. A list of the community meetings held to date is provided in Table 6-1.

Table 6-1. Summary of Community Meetings

Summary of Meeting	Date
Community Meeting – Lanikeha Community Center; Ho‘olehua, Molokai	September 12, 2024
Community Meeting – Keaukaha Elementary School; Hilo, Hawai‘i Island	October 28, 2024
Community Meeting – Maui Arts and Cultural Center; Kahului, Maui	October 29, 2024
Makakiko-Kapolei-Honokai Neighborhood Board Presentation – Kapolei Hale (O‘ahu)	January 22, 2025
Community Meeting – Salvation Army Kroc Center; ‘Ewa Beach, O‘ahu	January 27, 2025
Community Meeting – Lāna‘i Filipino Clubhouse; Lāna‘i City, Lāna‘i	March 3, 2025
Community Meeting – Kaua‘i High School; Līhu‘e, Kaua‘i	March 5, 2025
Community Meeting – Mitchell Pauole Center; Kaunakakai, Molokai	May 29, 2025
DHHL Beneficiary Meeting – Keaukaha Elementary School; Hilo, Hawai‘i Island	July 8, 2025

6.2 Meetings with Elected Officials, Regulatory Agencies, and Landowners

In addition to the larger community meetings, a variety of meetings were held with elected officials, regulatory agencies, landowners, and other stakeholders. In addition to providing general information regarding the need for the proposed middle mile broadband infrastructure and an overview of the HIFL system, these meetings were designed to address specific questions and solicit feedback from the various stakeholders. A summary of the meetings held to date is provided in Table 6-2.

Table 6-2. Meetings with Agencies, Landowners, and Other Stakeholders

Stakeholder Name	Date
U.S. Army Corps of Engineers Honolulu District, Regulatory Branch	March 14, 2023
National Oceanic and Atmospheric Administration (NOAA) Fisheries Protected Resources Division and Habitat Conservation Division	April 3, 2023
Hawaiian Islands Humpback Whale National Marine Sanctuary; NOAA and State of Hawai'i Department of Land and Natural Resources (DLNR) Co-Managers	April 4/5, 2023
NOAA Fisheries Protected Resources Division and Habitat Conservation Division	April 3, 2024
U.S. Army Corps of Engineers Honolulu District, Regulatory Branch	April 4, 2024
Maui County Planning Department	April 18, 2024
U.S. Army Corps of Engineers Honolulu District, Section 408 Coordinator	June 21, 2024
State of Hawai'i Department of Land and Natural Resources (DLNR) Chairperson	June 25, 2024
State of Hawai'i Department of Transportation (HDOT)	July 2, 2024
State of Hawai'i Division of Boating and Ocean Resources (DOBOR)	September 11, 2024
Pūlama Lāna'i	January 3, 2025
City and County of Honolulu Department of Planning and Permitting (DPP)	January 15, 2025
Maui County Planning Department	January 27, 2025
County of Hawai'i, Department of Research and Development	January 28, 2025
Pūlama Lāna'i	January 29, 2025
Office of Conservation and Coastal Lands (OCCL)	January 30, 2025
Lt. Governor Sylvia Luke	February 11, 2025
Hawai'i County Planning Department	March 14, 2025
State of Hawai'i Land Division	March 20, 2025
NOAA Fisheries Protected Resources Division and Habitat Conservation Division	April 21, 2025
County of Kaua'i Planning Department	April 24, 2025
Maui County Planning Department	April 25, 2025
Hawaiian Electric Company	May 21, 2025
State of Hawai'i Division of Aquatic Resources	June 5, 2025
DLNR Chairperson and DLNR Land Division	June 16, 2025
Lt. Governor Sylvia Luke	June 17, 2025
Outrigger Kaua'i Beach Resort Association	June 20, 2025
Department of Hawaiian Home Lands	June 20, 2025
Outrigger Kaua'i Beach Resort Association	July 15, 2025
City and County of Honolulu Department of Parks and Recreation	June 24, 2025
HDOT Harbors Division	July 29, 2025
Mānele Small Boat Harbor, Harbor Master	August 5, 2025

Stakeholder Name	Date
State of Hawai'i Division of Aquatic Resources	October 6, 2025
O'ahu Island Burial Council	October 8, 2025
Dr. Steven Doo (PACRC)	November 5, 2025
DLNR Land Division	November 13, 2025
Dr. Halena Kapuni-Reynolds	November 18, 2025
Kaua'i Ni'ihau Island Burial Council	November 19, 2025
Hawai'i Island Burial Council	November 20, 2025
Ulukoa Duhaylonsod	November 20, 2025
Kamealoha Hanohano Pa-Smith	November 20, 2025
DOBOR	November 21, 2025
Keaukaha Action Network	November 22, 2025
Kaua'i Historic Preservation Review Commission	December 15, 2025
Maui Lāna'i Island Burial Council	December 17, 2025
Keaukaha Action Network	January 3, 2026
Keaukaha Community Association	January 4, 2026
U.S. Army Corps of Engineers Honolulu District, Regulatory Branch	January 12, 2026
Molokai Planning Commission	January 14, 2025
Hawai'i Island Cultural Resource Commission	January 14, 2025
Keaukaha Community Association	January 21, 2026

6.3 Consultation for Cultural Impact Assessment and Historic Preservation Review Process

Additional stakeholder engagement efforts included consultation specifically for the CIA and Ka Pa'akai Analysis, as well as for the historic preservation review process pursuant to HRS Chapter 6E and NHPA Section 106. The CIA and Ka Pa'akai Analysis included mailing a detailed consultation letter to more than 325 local community organizations, advisory councils, government agencies, and knowledgeable individuals to obtain input regarding present and past land uses, cultural sites, traditional gathering practices, cultural association and any associated cultural concerns. A total of 33 individuals provided feedback or referrals via email, or were interviewed either via phone or Zoom. Additional information regarding the consultation process and feedback received is summarized in Section 3.9; a copy of the CIA and Ka Pa'akai Analysis is provided in Appendix I. Consultation has also been conducted as part of the historic preservation review process, pursuant to HRS Chapter 6E and NHPA Section 106. A letter initiating consultation was sent to approximately 230 NHOs, culturally-focused community organizations, commissions, board, and CIA participants in September 2025. These letters included a summary of the proposed undertaking, the results of background research and field investigation efforts to date, and sought input on historic properties within the Project Area and the nature of any potential effects. These consultation efforts will continue through the permitting process.

6.4 HRS Chapter 343 Scoping and Public Review Process

In addition to the general community outreach and consultation processes described above, consultation has also been conducted specifically for the HRS Chapter 343 environmental review process. These efforts have included pre-assessment scoping and distribution of the Draft EA for public comment, in accordance with the requirements of HRS Chapter 343 and HAR §11-200.1. The various agencies, elected officials, community organizations, and interested individuals contacted as part of the pre-assessment scoping and Draft EA public review process are listed in Table 6-3. Additional detail regarding the pre-assessment scoping and the Draft EA review process, including a summary of the scoping comments received, is provided the following sections.

Table 6-3. Organizations and Individuals Contacted for Draft EA Scoping and Public Review Process

Stakeholder[1/]	Pre-Assessment Scoping Letter[2/]		Draft EA		Final EA
	Sent Scoping Letter	Comment Received	Sent Notice of Availability	Comment Received	Sent Notice of Availability
Federal					
Department of the Navy	•		•		
Environmental Protection Agency	•		•		
National Oceanic Atmospheric Administration (NOAA) Fisheries	•		•		
Hawaiian Islands Humpback Whale National Marine Sanctuary	•		•		
U.S. Army Corps of Engineers	•		•		
U.S. Coast Guard	•	•	•		
U.S. Fish and Wildlife Service	•	•	•		
State of Hawai‘i					
Lt. Governor Sylvia Luke	•		•		
U.S. Senator Brian Schatz	•		•		
U.S. Senator Mazie Hirono	•		•		
U.S. Representative Ed Case	•		•		
U.S. Representative Jill Tokuda	•		•		
State Senator Ron Kouchi	•		•		
State Senator Sharon Moriwaki	•		•		
State Senator Henry Aquino	•		•		
State Representative Kyle Yamashita	•		•		
Department of Business, Economic Development and Tourism	•		•		
Office of Planning and Sustainable Development	•	•	•		
Hawai‘i Broadband and Digital Equity Office	•		•		
Department of Accounting and General Services	•	•	•		
Department of Hawaiian Home Lands	•		•		
Department of Health, Environmental Health Administration	•		•		
Department of Health, Clean Air Branch		•	•		
Department of Land and Natural Resources (DLNR)	•		•		
DLNR Division of Aquatic Resources	•		•		
DLNR Division of Boating and Ocean Recreation	•	•	•		

Stakeholder[1/]	Pre-Assessment Scoping Letter[2/]		Draft EA		Final EA
	Sent Scoping Letter	Comment Received	Sent Notice of Availability	Comment Received	Sent Notice of Availability
DLNR Division of Forestry and Wildlife	•	•	•		
DLNR Engineering Division	•	•	•		
DLNR Land Division[3/]	•	•	•		
Office of Conservation and Coastal Lands	•	•	•		
State Historic Preservation Division	•	•	•		
Department of Transportation (HDOT)	•	•	•		
HDOT Harbors Division	•	•	•		
HDOT Highways Division	•		•		
Hawai'i Emergency Management Agency	•	•	•		
Office of Hawaiian Affairs	•		•		
NHOs, Culturally Focused Organizations/Commissions, and CIA Participants					
ʻĀina Momona			•		
Hui Iwi Kuamoʻo			•		
Koa Ike Foundation			•		
The Mary Kawena Pūkuʻi Cultural Preservation Society			•		
Nā Ala Hele Trails and Access Program			•		
Kauaʻi Cable Landing Site					
County Agencies and Elected Officials					
Mayor Derek Kawakami	•		•		
State Representative Luke Evslin	•		•		
Council Chair Mel Rapozo	•		•		
Department of Parks and Recreation	•		•		
Kauaʻi Fire Department	•		•		
Kauaʻi Police Department	•		•		
Office of Economic Development	•		•		
Planning Department	•		•		
Public Works Department	•	•	•		
Landowners/Lessees, Nearby Businesses, Community Organizations, and Interested Individuals					
Garden Isle Dream LLC	•		•		
Kauaʻi Community College	•		•		
Kūhiō Hwy Investment LLC	•		•		
Kauaʻi Beach Resort Association	•		•		
Kauaʻi Beach Resort	•		•		
Kauaʻi Beach Villas	•		•		
Jonathan Chun	•		•		
Roger Jacobs	•		•		
Daniel Knutzen	•		•		
Conner Kosen	•		•		
Mark Perriello	•		•		
Pete Simon	•		•		

Stakeholder[1/]	Pre-Assessment Scoping Letter[2/]		Draft EA		Final EA
	Sent Scoping Letter	Comment Received	Sent Notice of Availability	Comment Received	Sent Notice of Availability
Jimmy Sone	●		●		
NHOs, Culturally Focused Organizations/Commissions, and CIA Participants					
Grove Farm Museum			●		
Hanalei River Heritage Foundation			●		
Kaiola Canoe Club			●		
Pihana Ka ʻIkena O Kauaʻi			●		
Kauaʻi Historic Preservation Review Commission			●		
ʻAha Moku Council			●		
Kauaʻi Niʻihau Island Burial Council			●		
Oʻahu Cable Landing Site					
County Agencies and Elected Officials					
Mayor Rick Blangiardi	●		●		
State Senator Mike Gabbard	●		●		
State Representative David Alcos III	●		●		
State Representative Diamond Garcia	●		●		
County Councilmember Andria Tupola	●		●		
Anthony Makana Paris, Neighborhood Board No. 34	●		●		
Department of Planning and Permitting	●	●	●		
Department of Parks and Recreation	●	●	●		
Office of Climate Change, Sustainability and Resiliency	●		●		
Department of Land Management	●		●		
Department of Transportation Services	●		●		
Honolulu Police Department	●		●		
Honolulu Fire Department	●	●	●		
Landowners/Lessees, Nearby Businesses, Community Organizations, and Interested Individuals					
UH West Oʻahu	●		●		
DR Fortress	●		●		
918 Hanua Street LLC	●		●		
Schnitzer Steel Hawaiʻi Corp	●		●		
ILPT OK 171 LLC	●[4/]		●		
ILPTOK 175 LLC	●		●		
GAROX LLC	●		●		
ILPT OK 119 LLC	●[4/]		●		
US Lighthouse Service	●[4/]		●		
Germaine's Luau	●[4/]		●		
Waianae Coast Comprehensive Health Center	●		●		
Sam Lipson	●		●		
Burt Lum	●		●		
NHOs, Culturally Focused Organizations/Commissions, and CIA Participants					
Hui Iwi Kuamoʻo			●		

Stakeholder[1/]	Pre-Assessment Scoping Letter[2/]		Draft EA		Final EA
	Sent Scoping Letter	Comment Received	Sent Notice of Availability	Comment Received	Sent Notice of Availability
Ka‘uikiokapō			•		
Koa Ike Foundation			•		
‘Aha Moku Council			•		
O‘ahu Island Burial Council			•		
Maui, Molokai, and Lāna‘i Cable Landing Sites					
County Agencies and Elected Officials					
Mayor Richard Bissen	•		•		
State Senator Troy Hashimoto	•		•		
State Senator Lynn DeCoite	•		•		
State Representative Justin Woodson	•		•		
State Representative Tyson Miyake	•		•		
State Representative Mahina Poepoe	•		•		
Council Chair Alice Lee	•		•		
Councilmember Kauanoe Batangan	•		•		
Councilmember Yuki Lei Sugimura	•		•		
Councilmember Keani Rawlins-Fernandez	•		•		
Councilmember Gabe Johnson	•		•		
Department of Environmental Management	•		•		
Department of Parks and Recreation	•	•	•		
Department of Public Works	•		•		
Department of Transportation	•		•		
Planning Department	•		•		
Department of ‘Ōiwi Resources	•		•		
Fire and Public Safety	•		•		
Police Department	•	•	•		
Keomailani Hanapi Hirata, Office of Councilmember Keani Rawlins-Fernandez	•		•		
Zhantell Lindo, County of Maui Community Outreach Specialist	•		•		
Department of Recreation, Molokai District	•		•		
Department of Hawaiian Home Lands, Molokai District Office	•		•		
Landowners/Lessees, Nearby Businesses, Community Organizations, and Interested Individuals (Maui)					
HDOT Kahului Harbormaster	•		•		
HDOT Maui District Engineer	•		•		
DOBOR Harbor Agent			•		
Maui Nui Botanical Gardens Inc.	•		•		
Hawai‘i Housing Finance & Development Corp	•		•		
UH Maui College	•		•		
Boys and Girls Club of Maui	•		•		
Maui Arts & Cultural Center	•		•		
Hale Kiawe Senior Fishing Club	•		•		

Stakeholder[1/]	Pre-Assessment Scoping Letter[2/]		Draft EA		Final EA
	Sent Scoping Letter	Comment Received	Sent Notice of Availability	Comment Received	Sent Notice of Availability
Maui Chamber of Commerce	●		●		
Hawai'i Community Foundation - Maui Strong Fund	●		●		
Hawai'i Pilots Association HPBS, Inc.		●	●		
Carl Rozycki	●		●		
David Tamanaha	●		●		
Jerry Isdale	●		●		
Ashley Day	●		●		
Burt Lum	●		●		
Megan Moseley	●		●		
Jeanne Skog	●		●		
NHOs, Culturally Focused Organizations/Commissions, and CIA Participants (Maui)					
Hanona Maui			●		
Hawaiian Canoe Club			●		
Ka 'Imi Na'auao O Hawai'i Nei			●		
Mālama Kakanilua			●		
Mālama Maui Nui			●		
'Aha Moku Council			●		
Maui/Lāna'i Island Burial Council			●		
Landowners/Lessees, Nearby Businesses, Community Organizations, and Interested Individuals (Molokai)					
Molokai Yacht Club	●		●		
Malama Cultural Park	●		●		
Molokai Education Center	●[4/]		●		
Kaunakakai Harbor	●		●		
Molokai Canoe Club			●		
Wa'akapaemua Canoe Club			●		
Justin Avelino	●[4/]		●		
Carrie DeCoite Caparida	●[4/]		●		
Dillon DeCoite	●		●		
Gene Ross Davis	●		●		
Rosie Davis	●		●		
Chadlyn Hirata	●		●		
Alice Kaahanui	●		●		
Charles Kaahanui III	●		●		
Dara Kaahanui	●		●		
Shannon Kaahanui	●		●		
Braeden Cabael-Kaahanui	●		●		
Jack Kiyonaga	●		●		
Iolani Kuoha	●		●		
Emily Mahiai	●		●		
F. Mahiai	●		●		

Stakeholder[1/]	Pre-Assessment Scoping Letter[2/]		Draft EA		Final EA
	Sent Scoping Letter	Comment Received	Sent Notice of Availability	Comment Received	Sent Notice of Availability
Sherry Sasada	•		•		
Sheron Sasada	•		•		
Robert Nerveza-Shizuma	•		•		
NHOs, Culturally Focused Organizations/Commissions, and CIA Participants (Molokai)					
ʻĀina Momona			•		
Teave Heen			•		
Molokai Planning Commission			•		
Landowners/Lessees, Nearby Businesses, Community Organizations, and Interested Individuals (Lānaʻi)					
Mānele Small Boat Harbor, Harbormaster	•		•		
Lānaʻi Resorts LLC	•		•		
Pūlama Lānaʻi	•		•		
Trilogy Corporation	•		•		
Coon Brothers Inc	•		•		
Robin Kaye	•		•		
Diane Preza	•		•		
Anthony Kaauamo	•		•		
Nina Garcia	•		•		
Lānaʻi Forest and Watershed Partnership			•		
Lānaʻi Community Health Center			•		
Lānaʻi Education Center			•		
NHOs, Culturally Focused Organizations/Commissions, and CIA Participants (Lānaʻi)					
Kumu Pono Associates LLC			•		
Lānaʻi Cultural & Heritage Center			•		
ʻAha Moku Council			•		
Hawaiʻi Island Cable Landing Site					
County Agencies and Elected Officials					
Mayor Kimo Alameda	•		•		
State Senator Lorraine Inouye	•		•		
State Representative Matthias Kusch	•		•		
State Representative Sue Keohokapu-Lee	•		•		
State Representative Chris Todd	•		•		
Councilmember Jenn Kagiwada	•		•		
Councilmember Dennis Onishi	•		•		
Department of Environmental Management	•		•		
Department of Planning	•	•	•		
Department of Public Works	•		•		
Department of Research and Development	•		•		
Fire Department	•		•		
Office of Sustainability, Climate, Equity and Resilience	•		•		
Parks and Recreation	•		•		

Stakeholder[1/]	Pre-Assessment Scoping Letter[2/]		Draft EA		Final EA
	Sent Scoping Letter	Comment Received	Sent Notice of Availability	Comment Received	Sent Notice of Availability
Police Department	•	•	•		
Landowners/Lessees, Nearby Businesses, Community Organizations, and Interested Individuals					
Pacific Aquaculture & Coastal Resource Center	•		•		
UH Hilo	•		•		
Department of Hawaiian Home Lands	•		•		
Hawaii Island Chamber of Commerce	•	•	•		
Keaukaha Community Association	•		•		
Panaewa Hawaiian Home Lands Community Association	•		•		
Kanoelehua Industrial Area Association (Hilo-Keaau)	•		•		
Native Hawaiian Chamber of Commerce	•		•		
Hui ʻOihana - Hawaii Island Native Hawaiian Chamber of Commerce	•		•		
Ka Umeke Charter School	•		•		
Piʻihonua Hawaiian Homestead Community Association	•		•		
Patrick L. Kahawaiolaa	•		•		
Uilani Evans	•		•		
Shola Kahiapo-Trevino	•		•		
Amber Ternus	•		•		
Greg DiBenedetto	•		•		
Aislen Bacalso	•		•		
Robert Kaneshiro	•		•		
Saturnino Doctor	•		•		
Laura Acasio	•		•		
Aaron Stene			•		
Robyn Riedel			•		
Greer Baba McKeen			•		
Maka Riedel			•		
Steve Doo			•		
Taelor Mercer			•		
Makoa Pascoe			•		
Bree Andrade			•		
Aria Tyav			•		
Roxane Keliʻikipikaneokolohaka			•		
Bruce Meyers			•		
Paul Thome			•		
Sue Champeny			•		
Kari Kaloi			•		
NHOs, Culturally Focused Organizations/Commissions, and CIA Participants					
Hawaiian Civic Club of Hilo			•		
Hoaʻāina Heritage Services, LLC			•		

Stakeholder[1/]	Pre-Assessment Scoping Letter[2/]		Draft EA		Final EA
	Sent Scoping Letter	Comment Received	Sent Notice of Availability	Comment Received	Sent Notice of Availability
Keaukaha Action Network			•		
National Museum of the American Indian			•		
Lehua Veincent			•		
ʻAha Moku Council			•		
County of Hawaiʻi Cultural Resource Commission					
Hawaiʻi Island Burial Council			•		
Utility Companies					
Kauaʻi Island Utility Cooperative	•		•		
Hawaiian Electric Company	•	•	•		
Maui Electric Company	•		•		
Hawaiʻi Electric Light Company	•		•		
Hawaiian Telcom	•		•		
Charter Spectrum	•		•		
Lumen	•		•		

1/ Community meeting attendees are included in the list of community organizations and interested individuals. The list of NHOs, culturally-focused organizations/commissions, and CIA participants include active participants in either the CIA and/or Section 106 consultation process to date.
2/ Copies of the pre-assessment scoping letter and comments received are provided in Appendices J and K.
3/ Comments were received from both the Oʻahu District and Hawaiʻi District of DLNR Land Division (see Appendix K).
4/ Pre-assessment scoping letter was sent to stakeholder but was returned as undeliverable.

6.4.1 Pre-Assessment Scoping

HAR Section 11-200.1-18 requires early consultation seeking the advice and input of the county agency responsible for implementing the county's general plan and other agencies having jurisdiction or expertise, as well as those citizen groups and individuals that may be affected by the proposed action. Pursuant to these requirements, as part of the scoping process for the Draft EA, the governmental agencies, elected officials, organizations, and individuals that may have a specific interest or could otherwise be affected by the Project were identified. These parties, which are listed in Table 6-3, were sent a scoping letter containing preliminary Project information and were asked to provide comments and related information for consideration in preparation of the Draft EA. A copy of the pre-assessment scoping letter is provided in Appendix J.

A total of 26 comment letters were received in response to the pre-assessment scoping request. The comments are summarized in Table 6-4, with copies of the comment letters and the responses in Appendix K. In accordance with the intent of HAR Section 11-200.1, the information and input received through the pre-assessment process was considered in the preparation of this Draft EA.

Table 6-4. Summary of Comments Received in Response to Pre-Assessment Scoping Letter

Commenting Party	Date of Comment	Summary of Comments
Hawai'i Island Chamber of Commerce	Email dated 4/10/25	Requests information regarding: (1) Project background and track record of projects completed in Hawai'i or in other states, (2) entity preparing the environmental assessment, (3) community outreach to date, (4) if Project will serve existing carriers and customers, (5) implementation timeline and maintenance schedule, (6) existing funding, Project costs and cost recovery, and (7) RFP plans, if any.
Maui Police Department	Email dated 4/15/25	Asks if fiber connections will be provided between Maui, Molokai, and Lāna'i to form a connectivity loop and whether a segment of fiber into East Maui is being considered; also noted that potential traffic impacts may need to be considered.
County of Maui, Department of Parks and Recreation	Email dated 4/17/25	No comment
County of Hawaii, Police Department	Letter dated 4/19/25	States that significant impacts related to traffic and/or public safety concerns are not anticipated.
Hawai'i State Department of Health Clean Air Branch	Email dated 4/22/25	Provided link to Clean Air Branch website with standard comments for land use reviews.
State of Hawai'i Department of Accounting and General Services	Letter dated 4/22/25	No comment; Project does not appear to directly impact any Department of Accounting and General Services projects or facilities.
City and County of Honolulu Department of Parks and Recreation	Letter dated 4/22/25	States understanding that the OSCT and HIFL Projects would utilize shared landing infrastructure at Barbers Point Beach Park and expressed agreement with sharing infrastructure and easements to minimize impacts; noted that it appears the HIFL terrestrial cable will be separate from OSCT; requested a meeting with the HIFL team to better understand how infrastructure will be shared between projects and clarification on the land dispositions HIFL will be seeking for use of Barbers Point Beach Park.
Hawaiian Electric Company	Email dated 4/24/25	Requests ongoing coordination to ensure that Project activities are compatible with Hawaiian Electric facilities and operations, including potential trenching near existing poles, access to easements, and connections within or near electrical service corridors; expresses no objections to the proposed scope of work as described, but recommends continued coordination as design and permitting advances, particularly regarding site-specific interface with existing electrical infrastructure, access and construction near utility rights-of-way, and power delivery to proposed CLS structures.
Hawai'i Emergency Management Agency	Email dated 4/28/25	States that Hawai'i Emergency Management Agency is located in Diamond Head crater, so would not be affected by any of the cable landing sites.
Hawai'i Department of Transportation, Harbors Division	Email dated 4/29/25	States that detailed engineering plans should be submitted for the HDD borehole and conduit alignment that will traverse through the Kahului Harbor breakwater area; notes that coordination is needed with HDOT Harbors' Property Management section to secure necessary land dispositions for Project components located within TMK (2) 3-7-001:021; states that consultation on the final Project design is needed in order for HDOT Harbors to coordinate project construction with Maui Harbor district so as not to conflict with any storage or cargo or other harbor related matters.
DLNR Office of Conservation and Coastal Lands	Letter dated 4/29/25	Notes that the portions of the Project within the conservation district are in the protective, limited, and resource subzones; states that the project appears to be an identified land use pursuant to HAR Section 13-5-22 (P-6, Public Purpose Use) which requires submittal of a Conservation District Use Application (CDUA) for a Board Permit and related attachments such as a Final EA; states the Project should comply with the provisions of HRS Chapter 205A (Hawai'i's Coastal Zone Management law) and HAR Section 13-5-40 (related to public hearings); provides reference to HRS Chapter 27-45 regarding the decision timeline for broadband-related permit applications within the conservation district.
Honolulu Fire Department	Letter dated 4/29/25	No comments at this time.

Commenting Party	Date of Comment	Summary of Comments
U.S. Coast Guard Civil Engineering Unit Honolulu	Email dated 5/5/25	States that the proposed cable landing sites on the islands of Hawai‘i, O‘ahu, Lāna‘i, Maui, and Molokai are within the vicinity of active USCG Aids to Navigation (ATON) (i.e. harbor range lights and associated equipment); requests confirmation that ATON structures and equipment shall not be obstructed or utilized as part of the HIFL Project.
Hawai‘i Pilots Association HPBS, Inc.	Letter dated 5/7/25	Expresses concern over the proposed location of the subsea cable outside Kahului Harbor with regard to safe marine navigation of transiting vessels due to wind speeds and winterly swells; notes that damage to or ensnarement of the HIFL cable is possible in this area due to ship anchoring and tow equipment as the harbor is a busy interisland barge discharge and loading port that experiences high tug and barge traffic.
DLNR Land Division, O‘ahu	Letter dated 5/8/25	States that any work/use of public lands, including submerged lands, would require land disposition from the Board of Land and Natural Resources.
DLNR Land Division, Hawai‘i Island	Letter dated 5/8/25	No objections.
DLNR Engineering Division	Letter dated 5/8/25	Provides information related to the compliance with the minimum standards of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44 CFR) and local community flood ordinances, which may be more restrictive; notes that the owner of the Project is responsible for researching the Flood Hazard Zone designation and provides resources and tools for flood hazard information.
DLNR Division of Boating and Ocean Recreation	Letter dated 5/8/25	No objections.
U.S. Fish and Wildlife Service	Email dated 5/9/25	Recommends generating a comprehensive species list using the iPaC (Information for Planning and Consultation) tool to help to provide a current representation of federally listed species and their potential habitats within the Project Area and formulation of any avoidance and minimization measures, as necessary; requests that the compiled species list is shared with USFWS for further analysis.
County of Hawai‘i Planning Department	Letter dated 5/9/25	Provides subject parcel TMK designations and information; recommends including information in the Draft EA on SMA assessment and shoreline setback area, project alignment with CZM objectives outlined in HRS Chapter 205A, consistency with Hawai‘i County General Plan, reference to Ka Pa‘akai Analysis, identification of any potential impacts to natural and cultural resources. Native Hawaiian traditional and customary rights, and documentation of community engagement and actions to reasonably reduce any impacts.
State of Hawai‘i Office of Planning and Sustainable Development	Letter dated 5/14/25	Provides an overview of recommended topics to cover in the Draft EA including: (1) triggers for the preparation of an EA per HRS Chapter 343, list of required permits, and maps/diagrams of project location; (2) CZMA federal consistency and applicable rules and regulations; (3) conformance with the Hawai‘i CZM Program objectives and supporting policies; (4) consultation with respective county planning departments regarding SMA and Shoreline Setback permitting requirements; and (5) identification and analysis of impacts and alternatives considered to ensure protection of nearshore coastal resources.
State Historic Preservation Division	Letter dated 5/7/25	Recommends Draft EA comply with all applicable laws and rules for HRS Chapter 343 and HAR Chapter 11-200 including the 1997 Guidelines for Assessing Cultural Impacts and a Ka Pa‘akai o ka ‘Āina framework analysis; recommends use of SHPD-permitted archaeological firms for archaeological work; recommends early, sustained, and respectful collaboration and consultation with NHOs, cultural practitioners, lineal descendants, and community stakeholders; requests to review and comment on any construction or land-altering activities in alignment with HRS Chapter 6E and HAR Section 13-275; provides site-specific information for each island; states that SHPD may have additional comments during review; requests forthcoming information and correspondence related to Project be submitted via HICRIS with assigned project number; states that UH is the office of record for this undertaking.

Commenting Party	Date of Comment	Summary of Comments
City and County of Honolulu Department of Planning and Permitting	Letter dated 5/2/25	Lists permit requirements including SMA Major Permit and Shoreline Setback Variance and respective approving authorities; states that Draft EA should address compliance with ROH Chapter 25 and include analysis of consistency with the SMA policies presented in ROH Section 25-3.1 and mandatory findings contained in ROH Section 25-4.1; lists specific issue areas requiring analysis including description of the existing topographic, geologic, and shoreline environment and a detailed discussion of the potential impacts and appropriate mitigation measures associated with coastal hazards and resiliency of the project relative to these hazards (particularly sea level rise); states that Draft EA should analyze nearshore and sensitive species and identify potential for presence of threatened, endangered, or protected flora and fauna, and their critical habitat within the Project Area; states that Draft EA must identify the soil types present within the study area, provide information regarding previously identified historic resources, discuss relevant cultural sites and practices that may be impacted by the project, and address potential impacts associated with encountering unknown historic properties during project implementation with project-specific mitigation measures to avoid and minimize any such impacts; recommends Draft EA include a Ka Pa‘akai analysis, address potential impacts to Native Hawaiian access and cultural practices, and incorporate standard agency-required mitigation measures to avoid or minimize such potential impacts.
State of Hawai‘i Division of Forestry and Wildlife	Letter (undated)	Provides detailed information regarding relevant critical habitat for federally and state listed species, federal and state administered lands, invasive species and pathogens, and associated impact avoidance and minimization measures.
County of Kaua‘i Department of Public Works, Engineering Division	Letter dated 5/9/25	States that applicant shall comply with all provisions of the "Sediment and Erosion Control Ordinance No. 808" and that BMPs shall be incorporated to the maximum extent practicable during construction; states that a Road Permit from the County of Kaua‘i is required for any work that includes excavation or temporary traffic control; states that floodplain ordinance does not apply; recommends contacting the County of Kaua‘i, Planning Department regarding the proposed development as well as State of Hawaii, Department of Transportation for work within the state Right of Way; states that project is responsible for securing all necessary approvals for proposed work on private property.
State of Hawai‘i Department of Transportation	Letter dated 5/19/25	Requests further discussion regarding the angle/approach of the cable rising from the seabed to Kahului Harbor to ensure safe navigation and operations; provides contact information for parties conducted wave surge model forecasting; encourages engaging the Hawai‘i Pilots Association for review and comments regarding piloting vessels into and out of Kahului Harbor and outreach to harbor users for their emergency plans or risks of accidental anchor dropping; suggests pursuit of information to understand the potential impact of sea level rise to groundwater inundation and shoreline erosion along Kahului Beach Road; states need to submit engineered plan drawing details to HDOT for the HDD borehole alignment and conduit that would traverse the western breakwater of Kahului Harbor; states that HDOT must be consulted on the final design to coordinate Project construction with HDOT Harbors Maui District; requests further discussion at Kaunakakai Harbor regarding the angle/approach of the cable rising from the seabed to the Molokai Yacht Club and location of the cable to the causeway connecting the highway to Kaunakakai Harbor; states requirement for a permit to Perform Work Upon State Highways including review and approval of construction drawings and a Traffic Management Plan; requests update on future progress of Draft EA.

6.4.2 Public Review of Draft EA

HAR Section 11-200.1 requires publication of a Draft EA in the Environmental Review Program (ERP) bimonthly bulletin, *The Environmental Notice*, followed by a 30-day public review period. In accordance with these requirements, the Draft EA was published in *The Environmental Notice* on February 8, 2026, with the 30-day public review period running from the publication date through March 10, 2026. Notice of the Draft EA publication and public review period, including instructions for submitting comments was sent to the entities listed in Table 6-3. Pursuant to HAR 11-200.1-5(e), hard copies of the Draft EA were also provided to Hawaii Documents Center as well as the nearest state

library to each cable landing site, as follows: Līhuʻe Public Library, Kapolei Public Library, Kahului Public Library, Molokai Public Library, Lānaʻi Public and School Library, and Hilo Public Library. Comments received regarding the Draft EA (postmarked on or before March 10, 2026) will be considered and incorporated into the Final EA, as appropriate.

6.5 Ongoing Stakeholder Engagement

Following the HRS Chapter 343 environmental review process, the Project team will continue to proactively engage the community through the remainder of the Project development process. Several of the state and county discretionary approval processes include opportunities for stakeholder input through a public hearing. Notice regarding application submittals and public hearings will be provided, as appropriate. Furthermore, the Project team will proactively engage with the community specific to each cable landing site prior to and throughout construction as needed. Advanced notice of construction activities would be properly disseminated to the public, and coordination with relevant organizations would be conducted to minimize potential conflicts with scheduled events.

7 SUMMARY OF FINDINGS AND ANTICIPATED DETERMINATION

7.1 Significance Criteria

The potential impacts of the Project have been thoroughly evaluated and discussed in this Draft EA. As detailed throughout the document, the Project would incorporate a variety of mitigation measures such that no significant impacts to the surrounding environment are anticipated.

The HRS Chapter 343 environmental review process requires that the sum of the effects of a proposed action on the quality of the environment be considered as part of the determination of significance. Specific significant criteria are identified in HAR Section 11-200.1-13 for consideration in determining whether the action may have a significant effect on the environment. These significance criteria are listed below, with an assessment of the Project relative to each criterion.

(1) Irrevocably commit a natural, cultural, or historic resource

Discussion: *Onshore portions of the Project Area are previously disturbed areas dominated by non-native plant species, with no unique or high-quality wildlife habitat present. As detailed in Section 2.5.4, the Project incorporates the use of HDD (along with implementation of an IDFR Contingency Plan) to install the cable beneath the shoreline at a depth ranging between approximately 35-85 feet (varies by site) to avoid and minimize impacts to any sensitive resources (e.g., beaches, dunes, reefs) to the extent practicable. Where it is not possible for the cable route to avoid sensitive resources, specific installation methodologies (e.g., hand placement by divers) would be used to minimize impacts to the extent possible. While some coral would be impacted during cable installation, it is expected that corals would recolonize and no permanent loss would occur; the Project would incorporate efforts to provide benefits related to the coastal environment within or near the Project Area to offset the effects of the cable installation. In addition, a range of BMPs would be implemented during construction, including agency-specified measures to protect federally and state listed species in both the terrestrial and marine environment. The Project would also incorporate all mitigation measures specified by SHPD through the historic preservation review process, as well as all recommendations identified in the CIA and Ka Pa‘akai Analysis. Furthermore, a Project-specific archaeological monitoring plan would be developed in consultation with SHPD; the monitoring plan would specifically address areas with potential cultural sensitives that warrant cultural monitoring during construction. Once installed, the cable landfall infrastructure would all be located at or below ground; the only above ground structures would be the CLS facilities within UH campuses. With implementation of impact avoidance and minimization measures, as detailed throughout this EA, the Project is not expected to significantly impact nor irrevocably commit any natural or cultural resource to loss or destruction.*

(2) Curtail the range of beneficial uses of the environment

Discussion: *The Project would not curtail the range of beneficial uses of the environment. The cable landfall infrastructure would be located at or below the ground surface in previously disturbed areas. As described above, HDD would be used to install the cable deep beneath the shoreline to avoid and minimize impacts to sensitive resources along the shoreline to the extent practicable. The subsea cable would be surface laid on the ocean floor, with hand placement by divers to minimize installation impacts to sensitive resources in nearshore waters. Once installed, it is anticipated that a majority of the cable*

would self-bury in areas of soft substrate with segments that traverse hard bottom potentially colonized by coral. While construction would result in some temporary displacement of onshore recreational areas during construction, public access to the shoreline would be maintained at all times. Similarly, during HDD and cable-laying activities, ocean waters would remain open to activities such as boating, surfing, diving, and swimming throughout Project construction, with monitoring and buffer zones around active work areas to maintain public safety. Following construction, the Project would not have any bearing on public access or recreational opportunities.

(3) Conflict with the State's environmental policies or long-term environmental goals established by law

Discussion: *The Project would not conflict with the State's environmental policies or long-term environmental goals, which are specified in HRS Chapter 344. A detailed discussion of the Project's consistency with these policies and goals is provided in Section 5.2.2.*

(4) Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State

Discussion: *The State of Hawai'i specifies broadband as foundational to Hawai'i's long-term economic future and, as importantly, the quality of life of its residents (DBEDT 2020). As such, the Project would provide significant economic and social benefits across the state by installing infrastructure that would provide high capacity and reliable broadband for use by agencies, businesses, and residents across the state. The system would augment existing infrastructure, which is aging and does not meet the current and projected future bandwidth demands associated with digital streaming and cloud technology. The Project would be sufficiently robust to meet both current and projected future needs, including those related to healthcare, education, research, public service, commerce, government, and personal uses. In doing so, the Project would be directly responsive to the objectives and priority guidelines in the Hawai'i State Plan as well as the general plans for the individual counties across the state, which call for a robust, resilient, and reliable telecommunications network to meet residents' needs (County of Kaua'i 2018; County of Maui 2012; County of Maui 2016; County of Maui 2018; County of Hawaii 2024.*

As described above, specific measures identified through the CIA and Ka Pa'akai Analysis would be implemented to avoid and minimize impacts to these resources, including maintenance of access to the beach, shoreline, and nearshore waters throughout construction; measures to protect marine resources and efforts to offset potential impacts; and development of a Project-specific archaeological monitoring plan, in consultation with SHPD, with site-specific protocols to be followed in the event of an inadvertent discovery of iwi kūpuna or other culturally significant materials. With implementation of these measures, the Project is not expected to have a substantial adverse effect on cultural practices.

(5) Have a substantial adverse effect on public health

Discussion: *The Project would be consistent with existing land uses and would not directly impact existing health care facilities, emergency services, or other aspects of public health services. Construction activities would result in impacts to air quality as a result of dust emissions and noise from construction vehicles and equipment; these impacts would be localized and temporary in nature. Implementation of impact avoidance and minimization measures, as described in Section 3, and compliance with federal,*

state and local regulations and applicable permit conditions would further reduce the potential for impacts that could affect public health. Once installed, the subsea fiber optic cable system is not expected to directly affect public health. However, it would provide indirect benefits by delivering robust and reliable broadband necessary for hospital and clinic-based healthcare services, maintenance of electronic healthcare records, as well as telehealth and remote patient monitoring.

(6) Involve adverse secondary impacts, such as population changes or effects on public facilities

Discussion: *The Project would not induce changes in land use, development, or population size at any of the cable landing sites. Public facilities would not be adversely affected nor would additional use of public facilities occur as a result of Project implementation. As such, no adverse secondary impacts are anticipated. Rather, by providing improved broadband connectivity, the Project could provide secondary benefits associated with increased productivity, training and education, and improved remote access.*

(7) Involve a substantial degradation of environmental quality

Discussion: *The Project would not involve a substantial degradation of environmental quality. As discussed throughout this EA, the Project would result in temporary and minor impacts during construction. Avoidance and minimization measures would be implemented such that impacts would be less than significant. Following construction, temporarily disturbed areas would be returned to pre-existing conditions. All cable landfall infrastructure would be located at or below ground; visual evidence of the cable landfall infrastructure would be limited to at-grade BMH manhole covers. The only new aboveground structures installed as part of the Project would be the CLS facilities, consisting of either equipment placed in an existing building or a small modular structure with an emergency generator, all located within developed areas on existing UH campuses.*

(8) Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions

Discussion: *The Project would neither result in substantial cumulative effects on the environment nor involve a commitment for larger actions. Other projects and activities in the vicinity of the Project Area that could affect the same environmental resources within a similar timeframe include installation of other subsea cable infrastructure, harbor dredging and improvement efforts, utility upgrade projects, expansion and improvement of UH campus facilities, and ongoing vessel traffic and harbor activities. When considered in combination with the potential impacts of the HIFL Project, it is anticipated that any potential cumulative impacts would be limited to short-term construction-related impacts such as those related to air quality, stormwater, noise, traffic, and terrestrial and marine biological resources. As detailed throughout this document, through implementation of avoidance and minimization measures, and compliance with applicable federal, state, and local regulations intended to protect the environment, the Project would not be expected to result in substantial adverse impacts, either individually or together in combination with other projects in the vicinity.*

(9) Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat

Discussion: *The onshore portions of the Project Area do not support any critical habitat, nor would any rare, threatened, or endangered plant species be impacted by the Project. Several federally and state listed wildlife species were either observed or documented, or could potential occur within or traverse over the Project Area for the various cable landing sites. For example, Hawaiian waterbirds are likely to be present in wetlands near the Kauaʻi and Molokai cable landfalls, and nēnē could potentially occur within the Kauaʻi and Hilo cable landing sites. Portions of the Project Area could also provide potential foraging and roosting habitat for the Hawaiian hoary bat, as well as foraging habitat for pueo. Although the onshore portion of the Project Area does not provide suitable nesting or foraging habitat for listed seabirds, individuals may fly over the Project Area at night during the breeding, nesting, and fledging seasons while transiting between higher elevation breeding colonies and the ocean. However, impacts to these species would be avoided through implementation of the measures listed in Section 3.7.3, which are consistent with recommendations provided by USFWS and DOFAW.*

Specific to the marine environment, HDD activities and cable installation would result in increased turbidity, noise, and vessel traffic, which could affect federally and state listed marine species. However, impacts are expected to be localized, short-term, and minor. With implementation of the BMPs listed in Section 3.6.3, which incorporate agency-specified measures including those required under Pac-SLOPES (USACE 2022), the Project is not expected to substantially affect rare, threatened, or endangered marine species. Furthermore, the Project would not permanently alter any critical habitat nor would it significantly reduce the quality or quantity of EFH.

(10) Have a substantial adverse effect on air or water quality or ambient noise levels

Discussion: *The Project would not significantly affect air quality, water quality, or ambient noise levels. Construction activities would require use of heavy equipment, vehicles, and vessels, which would result in the release of some air pollutants; in addition, ground disturbance (e.g., clearing and excavation) could result in the generation of fugitive dust. However, emissions of air pollutants and fugitive dust would be localized, at relatively low levels, and limited to the construction phase. Furthermore, BMPs such as maintaining vehicles and equipment in proper working order; complying with state and federal vehicle and emission standards; and preparing and implementing a dust control plan to control fugitive dust levels would minimize the magnitude and extent of any emissions.*

Similarly, these construction activities also could potentially result in sediment and other pollutants being conveyed by stormwater runoff into nearby marine waters. The likelihood of these activities impacting water quality is low due to the relatively small extent of disturbance area at each cable landing site, as well as implementation of BMPs and compliance with federal, state and local regulatory requirements (including CWA Section 401 WQC, NPDES, and county erosion control plans). Although not anticipated, an accidental release of drilling fluid used for HDD could also affect water quality. This risk would be minimized and mitigated through implementation of specific measures detailed in an IDFR Contingency Plan (Appendix D). With implementation of these measures, no significant impacts to water quality are expected.

The use of heavy equipment to construct the Project, particularly the HDD drill rig, would generate noise that would likely exceed local ambient noise levels and affect nearby areas during construction. However, increased noise levels would be short-term and localized. Reasonable efforts would be made to minimize the noise levels associated with Project construction to the extent practicable, including measures listed in Section 3.11; furthermore, a noise permit and/or variance would be obtained from HDOH in compliance with HAR Section 11-46, as necessary. Once construction of the Project is complete, the cable landfall infrastructure would be located at or below ground and would not generate any noise. Operational sound levels associated with the CLS would remain at a low level, such that noise impacts during operation would not be significant.

(11) Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters

Discussion: *Given the shoreline-dependent nature of subsea fiber optic cable systems, the Project would require installation of cable landfall infrastructure within the coastal flood hazard zone, sea level rise exposure area, and tsunami evacuation zone at each cable landing site. While it is not possible for the Project to avoid placement of this infrastructure within these hazard zones, all of the cable landfall infrastructure would be installed at or below ground; furthermore, the system components are designed and built for the marine environment such that they would be resilient to coastal flooding, should such conditions occur. Regardless, the Project incorporates a minimum design standard based on the 1.1-foot sea level rise scenario, as this roughly equates to the current mid-range projection for 2050, which generally corresponds to the design life of the subsea cable system. As such, the BMH (and all terrestrial infrastructure extending inland from the BMH) at each cable landfall has been sited outside the 1.1-foot SLR-XA, at a minimum. Where practicable, this infrastructure has been set back further, beyond the 2-foot and/or 3.2-foot SLR-XA. In all cases, the BMH and other terrestrial infrastructure has been sited inland of the maximum projected coastal erosion boundary, where mapped. As discussed in Section 3.1, the cable landfall infrastructure would be monitored on a regular basis over the life of the Project, including inspections following severe storms, to identify potential impacts of coastal flooding and erosion; mitigation would be implemented as needed to address any unanticipated issues related to erosion or inundation. As such, the cable landfall infrastructure would be resilient to coastal hazards over its design life.*

All CLS facilities would be built to meet or exceed all applicable building code requirements, such that impacts related to natural hazards would not be expected. In the case of the Maui and Molokai cable landing sites, these UH-owned properties where the CLS facilities would be located are within either the 100-year floodplain and/or tsunami evacuation zone. As such, the Maui CLS at UH Maui College would be within the tsunami evacuation zone; the Molokai CLS at the Molokai Education Center would be within both the tsunami as well as the flood hazard zone. These structures would be specifically designed to comply with the requirements for buildings within the Tsunami Design Zone; the Molokai CLS would also comply with the NFIP and county requirements for the flood zone (with a flood development permit obtained from Maui County Department of Public Works, Engineering Division, as needed).

(12) Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies

Discussion: *The Project would not substantially affect any scenic vistas or viewplanes identified in county or state plans or studies. Project construction would involve the temporary presence of heavy equipment in onshore portions of the Project Area as well as vessels along the cable route in nearshore and offshore waters. The presence and use of the equipment and vessels would be visible to the public from areas surrounding the cable landing sites, along the shoreline, and from nearshore areas, but would be removed upon completion of cable installation, such that visual impacts would be temporary. Once installed, all cable landfall infrastructure would be located at or below ground level, with the BMH manhole covers being the only visible component. The only aboveground structures associated with the Project would be the new CLS structures at UH Maui College, Molokai Education Center, and UH Hilo, as well as a new stand-alone emergency generator at KCC. The CLS facilities at UH Maui College would be visible from Wahinepio Avenue and nearby campus buildings; the CLS at Molokai Education Center would be visible from portions of Duke Maliu Regional Park, Kamehameha V Highway, and residences to the southwest beyond the highway. The Project components at UH Hilo and KCC would not be visible beyond the campus boundaries. The new CLS structures would be installed entirely on UH properties and would be designed to match the surrounding campus buildings; they would not extend above the existing structures and would not block or obstruct views from surrounding areas. As such, the Project would not result in any significant visual impacts.*

(13) Require substantial energy consumption or emit substantial greenhouse gases

Discussion: *The Project would not require substantial energy consumption. Construction activities would result in a short-term increase in energy consumption, including fueling construction vehicles, equipment, and vessels; however, this increase would be temporary and is not anticipated to be substantial.*

7.2 Anticipated Determination

Based upon the preliminary analysis and findings presented in this document, implementation of the Project is not expected to result in a significant adverse direct, indirect, or cumulative impact on the quality of the environment. As such, a FONSI is anticipated in accordance with HRS Chapter 343. This assessment is based on an evaluation of the Project impacts in relation to the significance criteria specified in HAR Section 11-200.1-13, as detailed above.

The anticipated determination is based on the preliminary analysis and findings of the environmental review process to date, as presented herein. Additional information and input obtained through the Draft EA public review process will be considered in finalizing the EA. A final determination will be made based on the analysis in the Final EA and published accordingly. If a FONSI is issued, the Project team would proceed with obtaining the required permits. If it is determined that the Project would result in significant impacts, either an EISPN would be published in *The Environmental Notice* or the Project would not proceed.

8 REFERENCES

Aguilar de Soto, N., et al. 2013. Anthropogenic noise causes body malformations and delays development in marine larvae. Scientific Reports, 3, 2831. https://doi.org/10.1038/srep02831

Ainley, D.G., R. Podolsky, L. de Forest, G. Spencer, and N. Nur. 2001. The status and population trends of the Newell's Shearwater on Kaua'i: Insights from modeling. In Evolution, Ecology, Conservation, and Management of Hawaiian Birds: A Vanishing Avifauna (J. M. Scott, S. Conant, and C. Van Riper III, Editors). Studies in Avian Biology 22:108–123.

Akoi, R. 1989. *Ku'u Home I Keaukaha: An Oral History*. Hui Ho'omau O Keaukaha Panaewa.

Allen, C., McCue, L., Coppenrath, C. 2024. Marine Turtle Biology and Assessment Program Final Programmatic Environmental Assessment. Pacific Islands Fisheries Science Center, U.S. DOI: https://doi.org/10.25923/yf87-7574

André, M., et al. 2016. Effects of noise on marine invertebrates. Marine Environmental Research, 120, 12-24. https://doi.org/10.1016/j.marenvres.2016.04.001

Athens, J.S., and C.L. Silva. 1983. *Archaeological and Historical Investigations at a Property Near Kaunakakai Wharf, Island of Molokai, Hawaii*. Archeological Consultant, Honolulu.

Baird, R.W., Cholewiak, D., Webster, D.L., Schorr, G.S., Mahaffy, S.D., Curtice, C., Harrison, J. and Van Parijs, S.M. 2015. Biologically Important Areas for Cetaceans Within US Waters-Hawai'i Region. Aquatic Mammals, 41(1), p.54.

Baird, R.W., McSweeney, D.J., Webster, D.L., Gorgone, A.M. and Ligon, A.D. 2003. Studies of odontocete population structure in Hawaiian waters: Results of a survey through the main Hawaiian Islands in May and June 2003. Report prepared under contract# AB133F-02-CN-0106 to the Southwest Fisheries Science Center, National Marine Fisheries Service, 8604.

Baker, J.D. and Johanos, T.C. 2004. Abundance of the Hawaiian monk seal in the main Hawaiian Islands. Biological Conservation, 116(1), pp.103-110.

Banko, P.C., J.M. Black, and W.E. Banko. 2020. Hawaiian Goose (*Branta sandvicensis*). Version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.hawgoo.01

Banko, W.E., P.C. Banko, and R.E. David. 1991. Specimens and probable breeding activity of the band-rumped storm-petrel on Hawaii. The Wilson Bulletin, 650-655.

Bannor, B.K. and E. Kiviat. 2020. Common Gallinule (*Gallinula galeata*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.comgal1.01

Barlow, J., 2006. Cetacean abundance in Hawaiian waters estimated from a summer/fall survey in 2002. Marine Mammal Science, 22(2), pp.446-464.

Blake, E. S., Landsea, C. W., & Gibney, E. J. 2007. *The Deadliest, Costliest, and Most Intense United States Tropical Cyclones from 1851 to 2006* (and Other Frequently Requested Hurricane Facts). NOAA Technical Memorandum NWS TPC-5.

Bonaccorso, F.J., C.M. Todd, A.C. Miles, and P.M. Gorresen. 2015. Foraging Range Movements of the Endangered Hawaiian Hoary Bat, *Lasiurus cinereus semotus*. Journal of Mammalogy 96(1):64-71.

Bradford, A.L., Forney, K.A., Oleson, E.M. and Barlow, J. 2017. Abundance estimates of cetaceans from a line-transect survey within the US Hawaiian Islands Exclusive Economic Zone. Fishery Bulletin, 115(2).

Bradford, A.L., Yano, K.M. and Oleson, E.M. 2022. Estimating the Winter Abundance of Cetaceans around the Main Hawaiian Islands. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-135, 46 p. DOI: https://doi.org/10.25923/801q-ke40.

Bureau of Ocean Energy Management (BOEM). 2025. Sea Turtle Acoustic Ecology: Addressing Priority Data Gaps in Knowledge of Sea Turtle Hearing Sensitivity. OCS Study BOEM 2025-011. https://espis.boem.gov/Final%20Reports/BOEM_2025-011.pdf

Carter, L. and C. Kraus. 2018. Seabed recovery following protective burial of subsea cables - Observations from the continental margin. Ocean Engineering. 157, 251-261. https://doi.org/10.1016/j.oceaneng.2018.03.037

Cascadia (Cascadia Research Organization). 2023. Minke whales in Hawaii. Available online: https://cascadiaresearch.org/hawaii-species/minke-whales/. Accessed August 2025.

Cascadia. 2025a. Field Project Updates. Goose beaked whale. Available online: https://cascadiaresearch.org/hawaii-species/goose-beaked-whales/. Accessed August 2025.

Cascadia. 2025b. Field Project Updates. False Killer Whale. Available online: https://cascadiaresearch.org/hawaii-species/false-killer-whales-hawaii/. Accessed August 2025.

Cascadia. 2025c. Bottlenose dolphins in Hawai'i. Available online: Bottlenose dolphins in Hawai'i - https://cascadiaresearch.org. Accessed October 2025.

Chaloupka, M., Work, T.M., Balazs, G.H., Murakawa, S.K. and Morris, R. 2008. Cause-specific temporal and spatial trends in green sea turtle strandings in the Hawaiian Archipelago (1982–2003). Marine Biology, 154, pp.887-898.

Ching, F.K.W., P.B. Griffin, W.P. Kikuchi, N.H. Albrecht, J.C. Belshe', and C. Stauder. 1973. *The Archaeology of Puna, Kaua'i: Niumalu Ahupua'a, Loko Kuapa O Alekoko*. Archaeological Research Center Hawaii, Lawai.

Climate Change Commission. 2018. Climate Change Brief. City and County of Honolulu. Adopted June 5, 2018. Available online at: https://static1.squarespace.com/static/59af5d3cd7bdce7aa5c3e11f/t/5bda020bf950b7dd16a458d6/1541014029634/Climate+Change+Brief.pdf

Coastal Research Collaborative. 2021. Hawai‘i Shoreline Study. School of Ocean and Earth Science and Technology (SOEST) at the University of Hawai‘i. Available online at: https://www.soest.hawaii.edu/crc/index.php/hawaii-shoreline-study-web-map

Coghlan, A. 2016. Hacker, the humpback whale who got tangled in an internet cable. NewScientist. https://www.newscientist.com/article/mg23231000-400-hacker-the-humpback-whale-who-got-tangled-in-an-internet-cable/

Corbin, A.B., A.T. Walker, L. Kalima, H.W. Smith, and S.T. Goodfellow. 2002. *Archaeological Inventory Survey Ocean Bay Plantation at Hanamā‘ulu Land of Hanamā‘ulu, Lihu‘e District, Island of Kaua‘i. (TMK:4-3-7-3:1;4-3-9-5:5).* Paul H. Rosendahl, Ph.D., Inc., Hilo.

Cotín, J., K.E. Davis, A.A. Siddiqi, and M.R. Price. 2018. Breeding phenology and daily activity of the Hawaiian Short-eared Owl (*Asio flammeus sandwichensis*) on O‘ahu.

County of Hawai‘i. 1971. Hilo Community Development Plan. Prepared by Belt, Collins & Associated, Ltd. Available online at: https://www.hawaiicounty.gov/home/showdocument?id=305698&t=638085294102430000

County of Hawai‘i. 2024. County of Hawai‘i General Plan 2045. Planning for a Sustainable Future. Final Recommended Draft. July 2024. Available online at: https://records.hawaiicounty.gov/Weblink/1/edoc/149447/General%20Plan%202045%20Final%20Draft%202_June2025.pdf

County of Hawai‘i. 2025. Hawai‘i County Wastewater Web Page. Available online at: https://gis.hawaiicounty.gov/arcgisportal/apps/webappviewer/index.html?id=9517e052e2464706bfc81165e35b7fcc

County of Kaua‘i. 2015. Līhu‘e Community Plan. Ordinance 989. Available online: https://www.Kaua‘i.gov/Government/Departments-Agencies/Planning/Long-Range-Division/Līhu‘e-Community-Plan. Accessed August 2025.

County of Kaua‘i. 2018. Kaua‘i Kakou: Kaua‘i County General Plan. 2018. Available online at: https://www.Kaua‘i.gov/files/assets/public/v/1/planning-department/documents/general-plan/Kaua‘i-kakou-general-plan-2018-online.pdf

County of Kaua‘i. 2025. Kaua‘i Coastal Erosion Study Update 2020. Special Management Area (SMA) Viewer. Available online at: https://www.Kaua‘i.gov/Government/Departments-Agencies/Planning/Special-Management-Area-Shoreline-Setback

County of Maui. 2002. Wailuku-Kahului Community Plan. Adopted by Ordinance No. 1674 in 1987, updated in 2002, and amended in 2019 by Ordinance No. 4996. Available online at: https://www.mauicounty.gov/DocumentCenter/View/1719/Wailuku-Kahului-Community-Plan-2002?bidId=

County of Maui. 2012. Maui Island Plan. Planning Department Long Range Division Adopted on December 28, 2012 by Ordinance 4004. Available online at: https://www.mauicounty.gov/DocumentCenter/View/84686/Whole-Maui-Island-Plan-Book?bidId=

County of Maui. 2016. Lānaʻi Community Plan. Adopted in 2016 by Ordinance 4343.

County of Maui. 2018. Molokai Island Community Plan. Adopted on December 17, 2018 by Ordinance 4920.

County of Maui. 2021. The Maui County 2030 General Plan Countywide Policy Plan, Adopted by Ordinance No. 3732 in March 2010 and amended in September 2021. Available online at: https://www.mauicounty.gov/420/Countywide-Policy-Plan

County of Maui. 2025a. Facilities - Keopuolani Regional Park. https://www.mauicounty.gov/Facilities/Facility/Details/Keopuolani-Regional-Park-400. Accessed August 2025.

County of Maui. 2025b. Facilities – Duke Maliu Regional Park. Available online: https://www.mauicounty.gov/Facilities/Facility/Details/Duke-Maliu-Regional-Park-194. Accessed August 2025.

CRBRH (Coconut Rhinoceros Beetle Response – Hawaiʻi). 2024. Coconut Rhinoceros Beetle Response. Accessed July 2024. https://www.crbhawaii.org/.

Currie, J.J., McCordic, J.A., Olson, G.L., Machernis, A.F. and Stack, S.H., 2021. The impact of vessels on humpback whale behavior: The benefit of added whale watching guidelines. *Frontiers in Marine Science*, *8*, p.601433.

Currie, J.J., Stack, S.H. and Kaufman, G.D. 2017. Modelling whale-vessel encounters: the role of speed in mitigating collisions with humpback whales (Megaptera novaeangliae). J. Cetacean Res. Manage., 17, pp.57-63.

CWRM (State of Hawaiʻi Department of Land and Natural Resources, Commission on Water Resource Management). 2019. Water Resource Protection Plan. Prepared by Townscape, Inc. https://files.hawaii.gov/dlnr/cwrm/planning/wrpp2019update/WRPP_ALL_201907.pdf.

CWRM (State of Hawaiʻi Department of Land and Natural Resources, Commission on Water Resource Management). 2022. Surface water hydrologic unit boundaries for the 8 major Hawaiian Islands as of August 2022. Layer Name: Watersheds (CWRM). https://geoportal.hawaii.gov/datasets/HiStateGIS::watersheds/explore?location=19.907608%2C-155.475058%2C8.18. Accessed November 2024.

DAR (State of Hawaiʻi Division of Aquatic Resources). 2008. Streams (both perennial and non-perennial). https://geoportal.hawaii.gov/datasets/HiStateGIS::streams/about. Accessed November 2024. DBEDT 2020. State Broadband Strategic Plan

DAR (State of Hawaiʻi Division of Aquatic Resources). 2025a. Sea Turtles in Hawaiʻi. Available online: https://dlnr.hawaii.gov/dar/species/sea-turtles/#:~:text=Green%20sea%20turtles%20are%20also,green%20sea%20turtles%20in%20Hawai%CA%BBi. Accessed September 2025.

DAR (State of Hawaiʻi Division of Aquatic Resources). 2025b. Regulated Areas - Kahului Harbor, Maui. https://dlnr.hawaii.gov/dar/regulated-areas/kahului-harbor-maui/. Accessed August 2025.

DAR (State of Hawai‘i Division of Aquatic Resources). 2025c. Regulated Areas – Kaunakakai Harbor, Molokai. https://dlnr.hawaii.gov/dar/regulated-areas/kaunakakai-harbor-molokai/. Accessed August 2025.

DAR (State of Hawai‘i Division of Aquatic Resources). 2025d. Hawai‘i Marine Life Conservation Districts, Lāna‘i - Mānele - Hulopo‘e. https://dlnr.hawaii.gov/dar/marine-managed-areas/hawaii-marine-life-conservation-districts/Lāna‘i-Mānele-hulopoe/. Accessed August 2025.

DAR (State of Hawai‘i Division of Aquatic Resources). 2025e. Regulated Fishing Areas on Hawai‘i Island - Hilo Bay, Wailoa River, and Wailuku River. https://dlnr.hawaii.gov/dar/regulated-areas/kaunakakai-harbor-molokai/. Accessed August 2025.

Day, R. D., et al. 2017. Exposure to seismic air gun signals causes physiological harm and alters behavior in the scallop Pecten fumatus. Proceedings of the National Academy of Sciences, 114(40), E8537–E8546. https://www.pnas.org/doi/pdf/10.1073/pnas.1700564114#:~:text=In%20a%20series%20of%20field-based%20experiments%2C%20we%20investi-gate,mass%20mortality%20or%20result%20in%20other%20sublethal%20effects.

DBEDT (Hawai‘i Department of Business, Economic Development and Tourism). 2020. *Hawai‘i Broadband Strategic Plan.* October. Available at https://broadband.hawaii.gov/wp-content/uploads/2020/11/Hawaii-BB-Plan-2020-FINAL_10-23-20_v1.1.pdf. Accessed July 2025

DBEDT (State of Hawai‘i Department of Business, Economic Development and Tourism). 2024a. Hawai‘i Digital Equity Plan. Connect Kākou. Hawai‘i Broadband & Digital Equity Office. February. Available online at: https://broadband.hawaii.gov/digitalequityplan/. Accessed July 2025.

DBEDT (State of Hawai‘i Department of Business, Economic Development and Tourism). 2024b. Population and Economic Projections for the State of Hawai‘i to 2050. Available online at: https://files.hawaii.gov/dbedt/economic/data_reports/LRF/2050-long-range-projections.pdf. Accessed July 2025.

DBEDT (State of Hawai‘i Department of Business, Economic Development and Tourism). 2025a. Labor Force/Employed/Unemployed. Available online at: https://dbedt.hawaii.gov/economic/datawarehouse/. Accessed July 2025.

DBEDT (State of Hawai‘i Department of Business, Economic Development and Tourism). 2025b. Industry Analysis. Job Share. Available online at: https://dbedt.hawaii.gov/economic/economy-dashboard/ . Accessed July 2025.

Denkinger, J., Parra, M., Muñoz, J. P., et al. 2013. Are boat strikes a threat to sea turtles in the Galapagos Marine Reserve? Ocean & Coastal Management, 80, 29–35. https://doi.org/10.1016/j.ocecoaman.2013.03.005

Department of Army and EPA. 2023b. Revised Definition of “Waters of the United States”, Conforming. Federal Register 88(173): 61964-61969.

DHHL (State of Hawai‘i Department of Hawaiian Home Lands). 2022. Malama Cultural Park Special Area Plan. Final July 2022. https://dhhl.hawaii.gov/wp-content/uploads/2022/07/Item-G-1-PLO-Malama-SAP-Exhibit-A.pdf. Accessed August 2025.

DHHL (State of Hawai‘i Department of Hawaiian Home Lands). 2025. Malama Cultural Park. Available online: https://dhhl.hawaii.gov/po/special-area-plans/malama-cultural-park/. Accessed August 2025.

DOBOR (State of Hawai‘i Division of Boating and Ocean Recreation). 2025. Molokai Island – Kaunakakai. https://dlnr.hawaii.gov/dobor/kaunakakai-small-boat-harbor/. Accessed August 2025.

DOFAW (State of Hawai‘i Division of Forestry and Wildlife). 2015. Hawaii’s State Wildlife Action Plan (SWAP). SWAP Species Fact Sheets. Available online: https://dlnr.hawaii.gov/wildlife/hswap/fact-sheets/. Accessed September 2025.

DOFAW (State of Hawai‘i Division of Forestry and Wildlife). 2015. Endangered Species Recovery Committee Hawaiian Hoary Bat Guidance Document.

DOFAW (State of Hawai‘i Division of Forestry and Wildlife). 2025a. Nā Ala Hele Trail & Access Program, Hulopoe-Huawai Fishing Trail. https://hawaiitrails.ehawaii.gov/trails/#/. Accessed August 2025.

DOFAW (State of Hawai‘i Division of Forestry and Wildlife). 2025b. Lāna‘i Offshore Islets Seabird Sanctuaries. https://dlnr.hawaii.gov/wildlife/sanctuaries/lana%CA%BBi-offshore-islets-seabird-sanctuaries/#puu_pehe. Accessed August 2025.

DPP (City and County of Honolulu, Department of Planning and Permitting). 2021. O‘ahu General Plan. November 2021. Adopted by the City Council on December 1, 2021, as Resolution 21-023, CD1. Available online: https://www.honolulu.gov/dpp/wp-content/uploads/sites/56/2024/07/General_Plan_RESO_21-23_CD1_For_DISTRIBUTION.pdf. Accessed August 2025.

DPP (City and County of Honolulu, Department of Planning and Permitting). 2020. ‘Ewa Development Plan. July. Available online at: https://www.honolulu.gov/dpp/wp-content/uploads/sites/56/2024/07/Ewa_DP_2013_Amended_2020_Ordinance_20-46.pdf

Dutton, P.H., Jensen, M.P., Frutchey, K., Frey, A., LaCasella, E., Balazs, G.H., Cruce, J., Tagarino, A., Farman, R. and Tatarata, M. 2014. Genetic stock structure of green turtle (*Chelonia mydas*) nesting populations across the Pacific islands. *Pacific Science*, *68*(4), pp.451-464.

eBird. 2021. eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York. Accessed September 2024. http://www.ebird.org.

Engilis Jr., A., K.J. Uyehara, and J.G. Giffin. 2020.Hawaiian duck (*Anas wyvilliana*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.hawduc.01

EPA (U.S. Environmental Protection Agency). 2024. Definition of "Waters of the United States": Rule Status and Litigation Update. Accessed November 2023. https://www.epa.gov/wotus/definition-waters-united-states-rule-status-and-litigationupdate.

Erbe, C, and C McPherson. 2017. Underwater noise from geotechnical drilling and standard penetration testing. The Journal of the Acoustical Society of America, 142(EL281). https://doi.org/10.1121/1.5003328

Federal Register. 2016. Pacific Island Fisheries; Hawai'i Bottomfish and Seamount Groundfish Revised Essential Fish Habitat and Habitat Areas of Particular Concern. DOC-NOAA 50 CFR Part 665: Vol. 81, No. 29, 12 Feb. 2016. Pp: 7494- 7496. RIN 0648–XD907.

FEMA (Federal Emergency Management Agency). 2024. 2020 NEHRP Provisions & Seismic Design Category Maps for 2024 IRC & IBC. https://www.fema.gov/sites/default/files/documents/fema_p-2192-nehrp-provisions-seismic-design-maps-2024-irc-ibc.pdf. Accessed September 2025.

FEMA (Federal Emergency Management Agency). 2025. Earthquake Hazard Maps. https://www.fema.gov/emergency-managers/risk-management/earthquake/hazard-maps. Accessed August 2025.

FHWA (Federal Highway Administration). 2006. Construction Noise Handbook. Report FHWA-HEP-06-015. Available online at: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/index.cfm

FHWA (Federal Highway Administration). 2025. Manual on Uniform Traffic Control Devices for Streets and Highways. Available online at: https://mutcd.fhwa.dot.gov/.

Fletcher, C. H. III, Grossman, E. E., Richmond, B. M., & Gibbs, A. E. 2002. Atlas of Natural Hazards in the Hawaiian Coastal Zone (U.S. Geological Survey Geologic Investigations Series I–2761). U.S. Department of the Interior, U.S. Geological Survey. https://pubs.usgs.gov/imap/i2761/i2761.pdf. Accessed August 2025.

Forney, K.A., Becker, E.A., Foley, D.G., Barlow, J. and Oleson, E.M. 2015. Habitat-based models of cetacean density and distribution in the central North Pacific. Endangered Species Research, 27(1), pp.1-20.

Frankel, A.S., Gabriele, C.M., Yin, S. and Rickards, S.H. 2022b. Humpback whale abundance in Hawai'i: Temporal trends and response to climatic drivers. Marine Mammal Science, 38(1), pp.118-138.

Freiwald, A., et al. (2004). Cold-water corals and ecosystems. Springer. Volume, issue, pages not applicable. DOI not available.

Gaos, A.R., LaCasella, E.L., Kurpita, L., Balazs, G., Hargrove, S., King, C., Bernard, H., Jones, T.T. and Dutton, P.H., 2020. Hawaiian hawksbills: a distinct and isolated nesting colony in the Central North Pacific Ocean revealed by mitochondrial DNA. *Conservation Genetics*, *21*(4), pp.771-783.Gaos, A.R., Kurpita, L., Bernard, H., Sundquist, L., King, C.S., Browning, J.H., Naboa, E., Kelly, I.K., Downs, K., Eguchi, T. and Balazs, G. 2021. Hawksbill nesting in Hawai 'i: 30-year

dataset reveals recent positive trend for a small, yet vital population. Frontiers in Marine Science, 8, p.770424.

Garcia, M. O., Caplan-Auerbach, J., De Carlo, E. H., Kurz, M. D., & Becker, N. (2006). Geology, geochemistry, and earthquake history of Lō'ihi Seamount, Hawai'iHawai'i's youngest volcano. *Chemie der Erde*, 66(2), 81–108.

Geolabs Inc. 2025a. Geotechnical Boring Logs and Laboratory Testing Records for the Hawai'i Island Fiber Link (HIFL) Submarine Fiber Optic Cable System; Kaua'i, Hawaii. June 2025.

Geolabs Inc. 2025b. Geotechnical Data Report Hawai'i Island Fiber Link (HIFL) Submarine Fiber Optic Cable System, Kahului, Maui, Hawaii. April 4, 2025.

Geolabs Inc. 2025c. Geotechnical Data Report Hawai'i Island Fiber Link (HIFL) Submarine Fiber Optic Cable System, Kaunakakai, Molokai, Hawaii. September 5, 2025.

Geolabs Inc. 2025d. Geotechnical Data Report Hawai'i Island Fiber Link (HIFL) Submarine Fiber Optic Cable System, Mānele Harbor, Lāna'i, Hawaii. September 4, 2025.

Geolabs Inc. 2025e. Geotechnical Boring Logs and Laboratory Testing Records for the Hawai'i Island Fiber Link (HIFL) Submarine Fiber Optic Cable System; Hilo, Hawaii. June, 2025.

Gilmartin, W.G. and Forcada, J., 2009. Monk Seals: *Monachus monachus*, *M. tropicalis*, and *M. schauinslandi*. In Encyclopedia of marine mammals (pp. 741-744). Academic Press.

Gorresen, P.M., F.J. Bonaccorso, C.A. Pinzari, C.M. Todd, K. Montoya-Aiona, and K. Brinck. 2013. A Five-year study of Hawaiian hoary bat (*Lasiurus cinereus semotus*) occupancy on the Island of Hawai'i. Hawai'i Cooperative Studies Unit, University of Hawai'i at Hilo, Technical Report 41.

Handy, E.S.C. 1940. *The Hawaiian Planter, Volume I: His Plants, Methods, and Areas of Cultivation*. Bulletin 161. Bishop Museum Press, Honolulu.

Hart, C. 2006. Scenic Resources Inventory and Mapping Project Available online: https://www.mauicounty.gov/DocumentCenter/View/10495/Scenic-and-Historic-Resources-Methodology-Report. Accessed August 2025

Hawai'i Broadband Task Force. 2008. *Hawai'ii Broadband Task Force Final Report: A Report to the Governor and Legislature of the State of Hawai'ii.* December. http://www.hbtf.org/files/HawaiiBroadbandTaskForceFinalReport.pdf

Hawai'i Climate Change Mitigation and Adaptation Commission. 2021. *State of Hawai'i Sea Level Rise Viewer.* Version 1.16. Prepared by the Pacific Islands Ocean Observing System (PacIOOS) for the University of Hawai'i Sea Grant College Program and the State of Hawai'i Department of Land and Natural Resources, Office of Conservation and Coastal Lands. Available online at: http://hawaiisealevelriseviewer.org.

Hawai'i Climate Change Mitigation and Adaptation Commission. 2022. *Hawai'i Sea Level Rise Vulnerability and Adaptation Report 2022 Update*. Available: https://climate.hawaii.gov/wpcontent/uploads/2023/04/Sea-Level-Rise-Adaptation-and-Vulnerability-2022-Update_Final2-1.pdf.

Hawai‘i Harbors. 2025. Mānele Harbor. Available online: https://Māneleharbor.com/. Accessed July 2025.

Hawkins, A. D. , Pembroke, A., Popper, A. 2015. Information gaps in understanding the effects of noise on fishes and invertebrates. Reviews in Fish Biology and Fisheries, 25: 39–64. Hazel, J., Lawler, I. R., Marsh, H., & Robson, S. 2007. Vessel speed increases collision risk for the green turtle (*Chelonia mydas*) in the Great Barrier Reef Marine Park. Endangered Species Research, 3, 105–113. https://www.int-res.com/articles/esr2007/3/n003p105.pdf

HDOH CAB (State of Hawai‘i Department of Health Clean Air Branch). 2024. State of Hawai‘i Annual Summary 2023 Air Quality Data. https://health.hawaii.gov/cab/files/2024/10/2023_AQ_Databook-final.pdf. Accessed August 2025.

HDOH CWB (State of Hawai‘i Department of Health Clean Water Branch). 2024. 2024 State of Hawai‘i Water Quality Monitoring and Assessment Report. Integrated Report to the U.S. Environmental Protection Agency and the U.S. Congress Pursuant to §303(d) and §305(b), Clean Water Act (P.L. 97-117). https://health.hawaii.gov/cwb/files/2024/09/IR-2024-final-draft.pdf. Accessed August 2025.

HDOH HEER (State of Hawai‘i Department of Health Hazard Evaluation and Emergency Response Office). 2021. Technical Guidance Manual. Section 6. Groundwater and Surface Water Sampling Public Review Draft. August 2021. https://geoportal.hawaii.gov/datasets/HiStateGIS::underground-injection-control-line-uic-line/about. Accessed September 2025.

HDOH SDWB (State of Hawai‘i Department of Health Safe Drinking Water Branch). 2023. Layer Name: Underground Injection Control Line. https://geoportal.hawaii.gov/datasets/HiStateGIS::underground-injection-control-line-uic-line/about. Hawai‘i Statewide GIS Program. Accessed September 2025.

HDOT (State of Hawai‘i Department of Transportation). 2023. HDOT Highways Program Status. Available online at: https://histategis.maps.arcgis.com/apps/MapSeries/index.html?appid=39e4d804242740a89d3fd0bc76d8d7de

HDOT (State of Hawai‘i Department of Transportation). 2025. FY Supplemental Operating Budget. Available online at: https://budget.hawaii.gov/wp-content/uploads/2023/12/29.-Department-of-Transportation-FY-25-SUPP.7H0.pdf

Heidel, M., L. Pyle, and H.H. Hammatt. 1997. *Archaeological Inventory Survey of the 110-Acre Maui Central Park, Wailuku, Maui (TMK: 3-8-07:1 and 3-7-01:2).* Cultural Surveys Hawai‘i, Inc., Kailua.

Hess, S.C., C.R. Leopold, K. Misajon, D. Hu, and J.J. Jeffrey. 2012. Restoration of movement patterns of the Hawaiian Goose. The Wilson Journal of Ornithology 124(3): 478-486.

HiEMA (Hawai‘i Emergency Management Agency). 2025. Tsunami Evacuation Zones. https://dod.hawaii.gov/hiema/public-resources/tsunami-evacuation-zone/. Accessed August 2025.

Honolulu Emergency Services Department. 2025. EMS Unit Locations. Available online: https://emergencyservices.honolulu.gov/emergency-medical-services/ems-unit-locations/. Accessed August 2025.

ICF. 2025b. O‘ahu Subsea Cable Telecommunications Project – Final Environmental Assessment. Available online at: https://files.hawaii.gov/dbedt/erp/Doc_Library/2025-10-08-OA-FEA-O‘ahu-Subsea-Cable-Telecommunications-Project.pdf

IPCC (Intergovernmental Panel on Climate Change). 2021. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Available online at: Climate Change 2021: The Physical Science Basis | Climate Change 2021: The Physical Science Basis

IPCC, 2014. *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

Jacobs, D.S. 1994. Distribution and abundance of the endangered Hawaiian hoary bat, *Lasiurus cinereus semotus*, on the island of Hawai‘i. Pacific Science. 48(2): 193-200.

Jacobs, D.S. 1999. The diet of the insectivorous Hawaiian hoary bat (*Lasiurus cinereus semotus*) in an open and a cluttered habitat. Canadian Journal of Zoology. 77: 1603-1608. 10.1139/z99-110.Magnacca, K.N., and C. King. 2013. Assessing the presence and distribution of 23 Hawaiian yellow-faced bee species on lands adjacent to military installations on O‘ahu and Hawai‘i Island. Pacific Cooperative Studies Unit, University of Hawai‘i at Mānoa. Technical Report 185.

Jokiel, P., Brown, E., Friedlander, A., Rodgers, S.K., & Smith, W.R. 2004. Hawai‘i coral reef assessment and monitoring program: Spatial patterns and temporal dynamics in reef communities. Pac. Sci. 58(2):159-174.

Kamai, N., G. Ida, R. Groza, and H.H. Hammatt. 2016. *Archaeological Inventory Survey Report for the Kaua‘i Community College Rezone Campus Project, Ha‘ikū, Niumalu, Nāwiliwili Ahupua‘a, Līhu‘e District, Kaua‘i. TMKs: [4] 3-4-007:001, 002, 003, and 006*. Cultural Surveys Hawai‘i, Inc., Kailua.

Kawasaki, M.T, P. J. Hart, and E. H. Paxton. 2019. Frequent Use of Upland Habitats by the Endangered Hawaiian Stilt (*Himantopus mexicanus knudseni*). Waterbirds 42(4), 431-438, (1 December 2019). https://doi.org/10.1675/063.042.0408.

Kimberlain, T.B. and M.J. Brennan. 2018. Hurricane Iselle (EP092014). National Hurricane Center Central Pacific Hurricane Center Tropical Cyclone Report. 31 July - 9 August 2014. Available online at https://www.nhc.noaa.gov/data/tcr/EP092014_Iselle.pdf

King, C.S. and Fund, H.I.W. 2011. An Assessment of Maui Hawksbill Sea Turtle (*Eretmochelys imbricata*) Characteristics and Habitat Utilizations from In-Water Surveys and Incidental Observations (1998-2013). Hawai ʻi Wildlife Fund Hawksbill Recovery Project report to NOAA Fisheries. 48pp.

Kogan, I., Paull, C. K., Kuhnz, L. A., Burton, E. J., Von Thun, S., Greene, H. G., & Barry, J. P. 2006. Environmental impact of a submarine cable: A case study of the ATOC/Pioneer Seamount cable. Continental Shelf Research, 26(6), 771–787. https://tethys.pnnl.gov/publications/environmental-impact-atocpioneer-seamount-submarine-cable

Komori, E. 1983. *Results of an Archaeological Reconnaissance Survey and a Search of Historic Documents, TMK 5-3-01:2, Lots 521 and 522, Kaunakakai, Molokaʻi, Hawaiʻi*. Bishop Museum, Honolulu.

Kratofil, M.A., Ylitalo, G.M., Mahaffy, S.D., West, K.L. and Baird, R.W. 2020. Life history and social structure as drivers of persistent organic pollutant levels and stable isotopes in Hawaiian false killer whales (Pseudorca crassidens). Science of the Total Environment, 733, p.138880.

Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S. and Podesta, M., 2001. Collisions between ships and whales. Marine Mammal Science, 17(1), pp.35-75.

Lammers, M.O., Pack, A.A. and Davis, L. 2003. Historical evidence of whale/vessel collisions in Hawaiian waters (1975–present). Ocean Science Institute. Available online: https://www.oceanwidescience.org/cms/wp-content/uploads/2014/12/Lammers-Pack-and-Davis-whale-collision-report.pdf. Accessed August 2025.

Lammers, M.O., Pack, A.A., Lyman, E.G. and Espiritu, L. 2013. Trends in collisions between vessels and North Pacific humpback whales (Megaptera novaeangliae) in Hawaiian waters (1975–2011). J. Cetacean Res. Manage., 13(1), pp.73-80.

Lee-Greig, T.L., K.M. Folio, and H.H. Hammatt. 2016. *Archaeological Inventory Survey Report for the Kaunakakai Drainage System "B" Improvements Project, Kaunakakai Ahupuaʻa, Molokaʻi District, Molokaʻi Island, TMKs: [2] 5-3-001:003 & 008 and 5-3-005:006 & 007*. Cultural Surveys Hawaiʻi, Inc., Kailua.

Maui County Council. 2002. Wailuku-Kahului Community Plan. Available online: https://www.mauicounty.gov/1523/Community-Plan-Maps. Accessed August 2025.

Maui Paddling Hui. 2025. M2M. https://www.mauipaddlinghui.com/. Accessed August 2025Maui County. 2025. Keopuolani Regional Park. Available online: https://www.mauicounty.gov/facilities/facility/details/Keopuolani-Regional-Park-400

Mobley, J.R., Bauer, G.B. and Herman, L.M., 1999. Changes over a ten-year interval in the distribution and relative abundance of humpback whales (Megaptera novaeangliae) wintering in Hawaiian waters. *Aquatic Mammals*, *25*, pp.63-72. Mobley, J.M., Spitz, S., Grotefendt, R., Forestell, P.,

Frankel, A. and Bauer, G. 2001. Abundance of humpback whales in Hawaiian waters: Results of 1993-2000 aerial surveys. Report to the Hawaiian Islands Humpback Whale National Marine Sanctuary, 9.

Molokai Yacht Club. 2023. Home. https://molokaiyachtclub.com/. Accessed August 2025.

Montoya-Aiona, K., P.M. Gorresen, K.N. Courtot, A. Aguirre, F. Calderon, S. Casler, S. Ciarrachi, J. Hoeh, J.L. Tupu, and T. Zinn. 2023. Multi-scale assessment of roost selection by ʻōpeʻapeʻa, the Hawaiian hoary bat (*Lasiurus semotus*). Plos one, 18(8): e0288280.

Moon. 2025. Molokai's Best Surf Spots. Available online: https://www.moon.com/travel/outdoors/best-surf-spots-molokai/. Accessed August 2025.

Moore, J. G., Clague, D. A., Holcomb, R. T., Lipman, P. W., Normark, W. R., & Torresan, M. E. (1989). Prodigious submarine landslides on the Hawaiian Ridge. *Journal of Geophysical Research: Solid Earth*, 94(B12), 17465–17484.

NFIP (National Flood Insurance Program). 2025. Flood Hazard Assessment Tool. https://fhat.hawaii.gov. Accessed September 2025.

NOAA (National Oceanic and Atmospheric Administration). 2019. Storm Events Database. National Centers for Environmental Information. https://www.ncei.noaa.gov/stormevents/. Accessed August 2025.

NOAA (National Oceanic and Atmospheric Administration). 2023. Climate of Hawaiʻi. National Centers for Environmental Information. https://www.ncei.noaa.gov. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2002. NOAA Raster Navigational Charts (RNC). Layer Names: Dumping Areas and Explosive Dumping Area. Hawaiʻi Statewide GIS Program. https://geoportal.hawaii.gov/datasets/marine-dumping-areas/about and https://geoportal.hawaii.gov/datasets/HiStateGIS::explosive-dumping-areas/about. Accessed

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2007. Recovery Plan for the Hawaiian Monk Seal (*Monachus schauinslandi*): Revision. https://repository.library.noaa.gov/view/noaa/3521. Accessed November 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2021a. Minke whale (*Balaenoptera acutorostrata scammoni*) Marine Mammal Stock Assessment Report for the Hawaiʻi Stock. Available online: https://media.fisheries.noaa.gov/2021-08/2020-Pacific-SARS-minke.pdf. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2021b. Sperm whale (Physeter macrocephalus): Hawaiʻi Stock. Available online: https://media.fisheries.noaa.gov/2021-08/2020-Pacific-SARS-SpermwhaleHI.pdf. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2022a. Main Hawaiian Islands Insular False Killer Whale Critical Habitat Map and GIS Data. Available online:

https://www.fisheries.noaa.gov/resource/map/main-hawaiian-islands-insular-false-killer-whale-critical-habitat-map-and-gis-data. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2022b. Hawaiian Monk Seal Critical Habitat Map and GIS Data. Available online: https://www.fisheries.noaa.gov/resource/map/hawaiian-monk-seal-critical-habitat-map-and-gis-data. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2023a. Proposed Rule to Designate Critical Habitat for Green Sea Turtles. Available online: https://www.fisheries.noaa.gov/action/proposed-rule-designate-critical-habitat-green-sea-turtles. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2023b. NOAA Fisheries' Proposed Marine Critical Habitat for Six Green Turtle Distinct Population Segments under the Endangered Species Act. Available online: https://www.fisheries.noaa.gov/s3/2023-07/Proposed-GreenTurtle-CH-mapsGIS.pdf. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2023c. Species Directory. Hawksbill Sea Turtle. Available online: https://www.fisheries.noaa.gov/species/hawksbill-turtle. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2024a. 2024 Update to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0): Underwater and In-Air Criteria for Onset of Auditory Injury and Temporary Threshold Shifts. U.S. Dept. of Commerce, NOAA. NOAA Technical Memorandum NOAA Fisheries-OPR-71, 182 p.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2024b. Draft U.S. Pacific Marine Mammal Stock Assessments: 2024. Available online: https://www.fisheries.noaa.gov/s3/2025-03/Draft-2024-Pacific-SARs.pdf. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2024c. National Report on Large Whale Entanglements Confirmed in the United States in 2022. January 2024. Available online: https://www.fisheries.noaa.gov/s3/2024-01/National-Report-Large-Whale-Entanglement-2022-508.pdf. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2024c. False Killer Whale (*Pseudorca crassidens*): Hawaiian Islands Stock Complex – Main Hawaiian Islands Insular, Northwestern Hawaiian Islands, and Hawai'i Pelagic Stocks. Marine Mammal Stock Assessment Report for the false killer whale. Available online:: https://www.fisheries.noaa.gov/s3/2024-12/2023-sar-FalseKW-hawaiianislands.pdf. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2024d. Hawaiian Monk Seal (*Neomonachus schauinsland*). Available online: https://www.fisheries.noaa.gov/s3/2024-12/2023-sar-monk-seal.pdf. Accessed July 2025.

NOAA Fisheries (National Oceanic and Atmospheric Administration Fisheries). 2025. Hawaiian Islands Humpback Whale National Marine Sanctuary. Maps, Charts, and Geographic Information Systems Data. Available online: https://hawaiihumpbackwhale.noaa.gov/about/maps.html. Accessed August 2025. Accessed September 2025.

NRCS (Natural Resources Conservation Service). 2025. Soil Survey Geographic Database (SSURGO). Accessed August 2025. https://www.nrcs.usda.gov/resources/data-and-reports/soil-survey-geographic-database-ssurgo

Oleson, E.M., Boggs, C.H., Forney, K.A., Hanson, M.B., Kobayashi, D.R., Taylor, B.L., Wade, P.R. and Ylitalo, G.M. 2010. Status review of Hawaiian insular false killer whales (*Pseudorca crassidens*) under the Endangered Species Act.

OmniTrak Group Inc. 2024. Statewide Assessment of Hawai'i's Digital Economy. Prepared for State of Hawai'i, Department of Business, Economic Development and Tourism, Hawai'i Broadband and Digital Equity Office. May. Available online at: https://app.box.com/s/4i4qoiwvh2gmvcnepqczpwww3fsvan1a. Accessed July 2025.

OPSD (State of Hawai'i Office of Planning and Sustainable Development). 2021. Clarification of the Hawai'i Coastal Zone Management Program Federal Consistency Decisions for the 2021 Nationwide Permits and Current 2017 Nationwide Permits. Letter to the USACE Honolulu District. February 1.

Pacific Birds (Pacific Birds Habitat Joint Venture). 2024. Strategic Plan for Hawai'i Wetlands.

Pailolo Challenge. 2025. Home. https://www.pailolo.com/. Accessed August 2025

Parham, J.E., G.R. Higashi, D.G.K. Kuamo'o, R.T. Nishimoto, S. Hau, J.M. Fitzsimons, D.A. Polhemus, and W.S. Devick. 2008. Atlas of Hawaiian Watersheds and Their Aquatic Resources. Prepared for the State of Hawai'i Department of Land and Natural Resources Division of Aquatic Resources. http://hawaiiwatershedatlas.com/index.html. Accessed July 2023.

Parker, D.M., Balazs, G.H., King, C.S., Katahira, L. and Gilmartin, W. 2009. Short-Range Movements of Hawksbill Turtles (Eretmochelys imbricata) from Nesting to Foraging Areas within the Hawaiian Islands. Pacific Science, 63(3), pp.371-382.

Parker, D.M., Dutton, P.H. and Balazs, G.H. 2011. Oceanic diet and distribution of haplotypes for the green turtle, *Chelonia mydas*, in the Central North Pacific. Pacific Science, 65(4), pp.419-431.

PBR Hawaii. 2020. Molokai Education Center Expansion, Final Environmental Assessment. Prepared for University of Hawai'i. Available online at: https://files.hawaii.gov/dbedt/erp/EA_EIS_Library/2020-02-08-MO-FEA-Molokai-Education-Center-Expansion.pdf

Piniak, G. A., & Storlazzi, C. D. 2008. Diurnal variability in turbidity and coral fluorescence on a fringing reef flat: Southern Molokai, Hawaii. Estuarine, Coastal, and Shelf Science, 77(1), 56-64. https://doi.org/10.1016/j.ecss.2007.08.023

Pinzari, C., R. Peck, T. Zinn, D. Gross, K. Montoya-Aiona, K. Brinck, M. Gorressen, and F. Bonaccorso. 2019. Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) activity, diet and prey availability at the Waihou Mitigation Area, Maui. Technical Report HCSU-090. Hawai'i Cooperative Studies Unit, University of Hawai'i at Hilo, Hilo, Hawai'i. June 2019.

Popper, A. N., & Hawkins, A. D. 2019a. An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes. Journal of Fish Biology, 94(5), 692-713. https://doi.org/10.1111/jfb.13948

Popper, A. N., & Hawkins, A. D. 2019b. Effects of noise on fish. Fish and Fisheries, 20(2), 330-351. https://doi.org/10.1111/faf.12311

Popper, A.N, and Hastings M.C. 2009. The Effects of Anthropogenic Sources of Sound on Fishes. Journal of Fish Biology. 75(3) 455-489. https://doi.org/10.1111/j.1095-8649.2009.02319.x

Popper, A.N, Hawkins, A.D., Fay, R.R., and Mann, D.A. 2014. Sound Exposure Guidelines. ASA S3/SC1.4 TR-2014 Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. https://doi.org/10.1007/978-3-319-06659-2_7

Pratt, H.D. and I. L. Brisbin Jr. 2020. Hawaiian Coot (*Fulica alai*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.hawcoo.01

Price, M. and J. Cotín. 2017. Population size, distribution, and habitat use of the Hawaiian short-eared owl (*Asio flammeus sandwichensis*) on O'ahu. Accessed July 2024. https://dlnr.hawaii.gov/wp-content/uploads/2017/10/FW18-Pueo-Rpt.pdf.

Pūlama Lāna'i. 2019. Hulopo'e Beach Park ~ Non-Lāna'i Resident Camping. Available online: https://Lāna'i96763.com/wp-content/uploads/2019/12/Hulopoe-Beach-Camping_2020.pdf. Accessed Augusts 2025.

Race Roster. 2025. Molokai Holokai Ho'olaule'a. https://raceroster.com/events/2025/100650/molokai-holokai-hoolaulea. Accessed August 2025.

Roberts, L., and M. Elliott. 2017. Good or bad vibrations? Impacts of anthropogenic vibration on the marine epibenthos. Science of the Total Environment.595(1). 255-268. https://doi.org/10.1016/j.scitotenv.2017.03.117

Robinson, J.A., J.M. Reed, J.P. Skorupa, and L.W. Oring. 2020. Black-necked Stilt (*Himantopus mexicanus*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.bknsti.01

Rodríguez, A., N.D. Holmes, P.G. Ryan, K.-J. Wilson, L. Faulquier, Y. Murillo, A.F. Raine, J.F. Penniman, V. Neves, B. Rodríguez, J.J Negro, A. Chiaradia, P. Dann, T. Anderson, B. Metzger, M. Shirai, L. Deppe, J. Wheeler, P. Hodum, C. Gouveia, V. Carmo, G.P. Carreira, L. Delgado-Alburqueque, C. Guerra-Correa, F.-X. Couzi, M. Travers and M.L. Corre. 2017. Seabird mortality induced by land-based artificial lights. Conservation Biology, 31: 986-1001.

Schroeder, T.A. 1993. Climate controls. In, Sanderson, M. (ed.) Prevailing Trade Winds. Honolulu: University of Hawai‘i Press.

Seitz, W.A., Kagimoto, K.M., Luehrs, B. and Katahira, L. 2012. Twenty years of conservation and research findings of the Hawai ‘i Island hawksbill turtle recovery project, 1989-2009.

Slabbekoorn, H., et al. (2010). A noisy spring: The impact of globally rising underwater sound levels on fish. Trends in Ecology & Evolution, 25(7), 419–427. https://doi.org/10.1016/j.tree.2010.04.005

Soltz, A., D.W. Shideler, and H.H. Hammatt. 2014. *Archaeological Inventory Survey for the Kaua‘i Beach Resort Overflow Parking Project Hanamā’ulu Ahupua‘a, Līhu’e District, Kaua‘i TMK: [4] 3-7-003: 017 Por*. Cultural Surveys Hawai‘i, Inc., Kailua.

State of Hawai‘i Department of Taxation. 2021. Tax Facts 37-1. General Excise Tax (GET).

Sweet, W.V., B.D. Hamlington, R.E. Kopp, C.P. Weaver, P.L. Barnard, D. Bekaert, W. Brooks, M. Craghan, G. Dusek, T. Frederikse, G. Garner, A.S. Genz, J.P. Krasting, E. Larour, D. Marcy, J.J. Marra, J. Obeysekera, M. Osler, M. Pendleton, D. Roman, L. Schmied, W. Veatch, K.D. White, and C. Zuzak, 2022: Global and Regional Sea Level Rise Scenarios for the United States: Updated Mean Projections and Extreme Water Level Probabilities Along U.S. Coastlines. NOAA Technical Report NOS 01. National Oceanic and Atmospheric Administration, National Ocean Service, Silver Spring, MD, 111 pp. https://oceanservice.noaa.gov/hazards/sealevelrise/noaa-nostechrpt01-global-regional-SLR-scenarios-US.pdf Szesciorka, A.R., Ballance, L.T., Širović, A., Rice, A., Ohman, M.D., Hildebrand, J.A. and Franks, P.J. 2020. Timing is everything: Drivers of interannual variability in blue whale migration. Scientific Reports, 10(1), p.7710.

Takata-Tonini, K. 2025. Humpback whale entanglement case study. Volume, issue, pages, and DOI not available.

Tanaka, K., D.W. Shideler, and H.H. Hammatt, 2024. Ka Pa‘akai Analysis for the Kunia Village New Source Well Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu TMK: (1) 9-2-005:023 por. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Taormina, B., Bald, J., Want, A., Thouzeau, G., Lejart, M., Desroy, N., & Carlier, A. 2018. A review of potential impacts of submarine power cables on the marine environment: Knowledge gaps, recommendations and future directions. Renewable and Sustainable Energy Reviews, 96, 380–391. https://doi.org/10.1016/j.rser.2018.07.026

U.S. Census Bureau. 2022. Glossary. Block Group. Available online at: https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_4

U.S. Census Bureau. 2025a. QuickFacts Hawaii. Available online: https://www.census.gov/quickfacts/fact/table/HI/LFE305223#LFE305223

U.S. Census Bureau. 2025b. DP02: Selected Social Characteristics. 2019-2023 American Community Survey 5-Year Estimates. Available online at: https://data.census.gov/cedsci/

UH Hilo (University of Hawai‘i at Hilo). 2025. UH Hilo Stories. *UH Hilo-led study confirms sewage presence in Keaukaha’s coastal waters and coral reefs*. January 21. Available online at: https://hilo.hawaii.edu/chancellor/stories/2025/01/21/study-sewage-keaukaha/

University of Hawai‘i. 2024a *Connect Kakou Strategic Framework.* Available at https://www.hawaii.edu/broadband/strategic-framework/. Accessed July 2025.

University of Hawai‘i. 2024b. Connect Kakou, *Internet for All of Hawai‘i.* Available at https://www.connectkakou.org/ . Accessed July 2025.

USACE (U.S. Army Corps of Engineers). 2018. Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33USC 408. Engineering Circular (EC) 1165-2-220. September 10. Available online at: https://www.publications.usace.army.mil/Portals/76/Publications/EngineerCirculars/EC_1165-2-220.pdf?ver=2018-09-07-115729-890

USACE (U.S. Army Corps of Engineers). 2022. Reinitiation of Informal Consultation and Conference for the U.S. Army Corps of Engineers Pac-SLOPES Program. March 4. Available online at: https://www.poh.usace.army.mil/Portals/10/docs/Regulatory/PacSLOPES-2022-LoC-Reinitiation_final-(NMFS)-030422.pdf?ver=s8HuH5vGlj8bMeuD5GuqPw%3d%3d

USACE (U.S. Army Corps of Engineers). 2024a. Information Paper: Kahului Deep Draft Harbor, Maui, Hawaii. February 9. Available online at: https://www.poh.usace.army.mil/Portals/10/Users/117/33/2933/Kahului%20Project%20Information%20(2-9-24).pdf

USACE (U.S. Army Corps of Engineers). 2024b. Civil Works Projects: Kaunakakai Harbor. Available online at: https://www.poh.usace.army.mil/Missions/Civil-Works/Civil-Works-Projects/Kaunakakai-Harbor/

USACE (U.S. Army Corps of Engineers). 2025a. National Channel Framework. Geodatabase Map Viewer. Available online at: https://www.arcgis.com/home/item.html?id=9227967a2748410983352b501c0c7b39

USACE (U.S. Army Corps of Engineers). 2026. Reissuance and Modification of Nationwide Permits (91 FR 768). Available online at: https://www.federalregister.gov/documents/2026/01/08/2026-00121/reissuance-and-modification-of-nationwide-permits?utm_campaign=subscription+mailing+list&utm_medium=email&utm_source=federalregister.gov

USFWS (U.S. Fish and Wildlife Service). 1998. Recovery Plan for the Hawaiian hoary bat (*Lasiurus cinereus semotus*). U.S. Fish and Wildlife Service, Portland, OR

USFWS (U.S. Fish and Wildlife Service). 2003. Endangered and Threatened Wildlife and Plants; Final Designation or Nondesignation of Critical Habitat for 95 Plant Species From the Islands of Kaua‘i and Niihau, HI; Final Rule. Federal Register Vol. 68, No. 39.

USFWS (U.S. Fish and Wildlife Service). 2011. Recovery plan for Hawaiian Waterbirds, Second Revision. October 28, 2011.

USFWS (U.S. Fish and Wildlife Service). 2012. Endangered and Threatened Wildlife and Plants; Endangered Status for 23 Species on Oʻahu and Designation of Critical Habitat for 124 Species; Final Rule. Federal Register 77 (181): 57648-57862.

USFWS (U.S. Fish and Wildlife Service). 2023. Animal Avoidance and Minimization Measures. Accessed November 2024. https://www.fws.gov/sites/default/files/documents/Animal Avoidance and Minimization Measures - FINAL May 2023_0.pdf.

USFWS (U.S. Fish and Wildlife Service). 2023b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Green Sea Turtle. Federal Register. 88 (137): 46376- 46570.

USFWS (U.S. Fish and Wildlife Service). 2025. National Wetlands Inventory. Wetlands Data by State, Hawaiʻi. https://www.fws.gov/node/264847. Accessed August 2025.

USGS (U.S. Geological Survey). 2019a. Earthquakes in Hawaii: what you need to know. https://volcanoes.usgs.gov/vsc/file_mngr/file-164/PPT_EQ%20in%20Hawaii_2015-2019.pdf. Accessed August 2025.

USGS (U.S. Geological Survey). 2019b. Ecology and Distribution of the Endangered Hawaiian Hoary Bat. Accessed November 2024. https://www.usgs.gov/pacific-island-ecosystems-research-center/science/ecology-and-distribution-endangered-hawaiian#:~:text=Distribution%20and%20seasonal%20altitudinal%20migration,appears%20to%20occur%20was%20documented.

USGS (U.S. Geological Survey). 2020. Could it Happen Here? Pacific Coastal and Marine Science Center. https://www.usgs.gov/centers/pcmsc/could-it-happen-here. Accessed August 2025.

USGS (U.S. Geological Survey). 2023. National Hydrography Dataset. https://www.usgs.gov/nationalhydrography/access-national-hydrography-products. Accessed November 2024.

Uyehara, K.J., A. Engilis Jr, and B.D. Dugger. 2008. Wetland features that influence occupancy by the endangered Hawaiian duck. Wilson Journal of Ornithology 120:311-319.

Van Houtan, K.S. and Kittinger, J.N. 2014. Historical commercial exploitation and the current status of Hawaiian green turtles. *Biological Conservation*, *170*, pp.20-27.

Vanderlaan, A. S. M., & Taggart, C. T. 2007. Risk factors for whale-vessel collisions. Marine Mammal Science, 23(1), 144-156. https://doi.org/10.1111/j.1748-7692.2006.00098.x

Visit Molokai. 2024. Molokai Attractions. https://visitmolokai.com/wp/attractions-what-to-see-on-molokai/. Accessed August 2025.

Wagner, W. L., N.R. Kahn, and D.H. Lorence. 2023. Flora of the Hawaiian Islands website. Accessed August 2024. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm.

Walker, A.T., L. Kalima, and S.T. Goodfellow. 1991. *Archaeological Inventory Survey, Lihuʻe/Puhi/Hanamāʻulu Master Plan, Lands of Hanamāʻulu, Kalapaki, Nāwiliwili, Niumalu, and Wailua, Līhuʻe District, Island of Kauaʻi.* Paul H. Rosendahl, Ph.D., Inc., Hilo.

Wallace, B.P., Kot, C.Y., DiMatteo, A.D., Lee, T., Crowder, L.B. and Lewison, R.L. 2013. Impacts of fisheries bycatch on marine turtle populations worldwide: toward conservation and research priorities. Ecosphere, 4(3), pp.1-49.

Warner, G.A. and A. McCrodan. 2011. Underwater Sound Measurements. (Chapter 3) In Hartin, K.G., L.N. Bisson, S.A. Case, D.S. Ireland, and D.E. Hannay (eds.). Marine mammal monitoring and mitigation during site clearance and geotechnical surveys by Statoil USA E&P Inc. in the Chukchi Sea, August-October 2011: 90-day report. LGL Rep. P1193. Report by LGL Alaska Research Associates, Inc. and JASCO Research Ltd. for Statoil USA E&P Inc., NMFS, and USFWS.

Welch, D.J., A.A. Morgan, C.M. Magnuson, and U.K. Prasad, 2004. Archaeological and Cultural Impact Assessment of Cultural Resources at Kahului Harbor, TMK: 3-7-01:21,22, 3-7-10:2,3,6,13,15,21,22,24,26,27,28,30,32,34 & 3-7-08:2,3,4 & 6. International Archaeological Research Institute, Inc., Honolulu, Hawai‘i.

Wiggins, D.A., D.W. Holt, and S.M. Leasure. 2020. Short-eared Owl (*Asio flammeus*), version 1.0. In Birds of the World (S. M. Billerman, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.sheowl.01

Wilson Okamoto Corporation. 2011. Draft Environmental Assessment Kaua‘i Community College Resignation to Urban District. Accessed November 2024. https://files.hawaii.gov/dbedt/erp/EA_EIS_Library/2011-05-08-KA-DEA-Kaua‘i-Comm-College-Urban-District.pdf.

Wilson Okamoto Corporation. 2024. Final Environmental Assessment. Hilo Wastewater Treatment Plant Rehabilitation and Replacement Project. Hilo, Hawaii Island, Hawaii. TMK (3) 1-2-013:002. Available online at: https://files.hawaii.gov/dbedt/erp/Doc_Library/2024-03-23-HA-FEA-Hilo-Wastewater-Treatment-Plant-Rehabilitation-and-Replacement.pdf

Winterer, E. L., Natland, J. H., & Thiede, J. (1978). Mesozoic and Cenozoic sedimentation in the central Pacific. *Geological Society of America Bulletin*, 89(8), 1209–1224.

Wood, M., & Carter, L. 2008. Whale entanglements with submarine telecommunication cables. IEEE Journal of Oceanic Engineering, 33(4), 445–450. https://doi.org/10.1109/JOE.2008.2001638

WPRFMC (Western Pacific Regional Fishery Management Council). 2009. Fishery Ecosystem Plan for the Hawai‘i Archipelago. Honolulu. Western Pacific Regional Fishery Management Council. 266 pp.

WPRFMC (Western Pacific Regional Fishery Management Council). 2016. Amendment 4 to the Fishery Ecosystem Plan for the Hawai‘i Archipelago: Revised descriptions and identification of Essential Fish Habitat and Habitat Areas of Particular Concern for Bottomfish and Seamount Groundfish of the Hawaiian Archipelago. Western Pacific Regional Fishery Management Council. 243 pp.

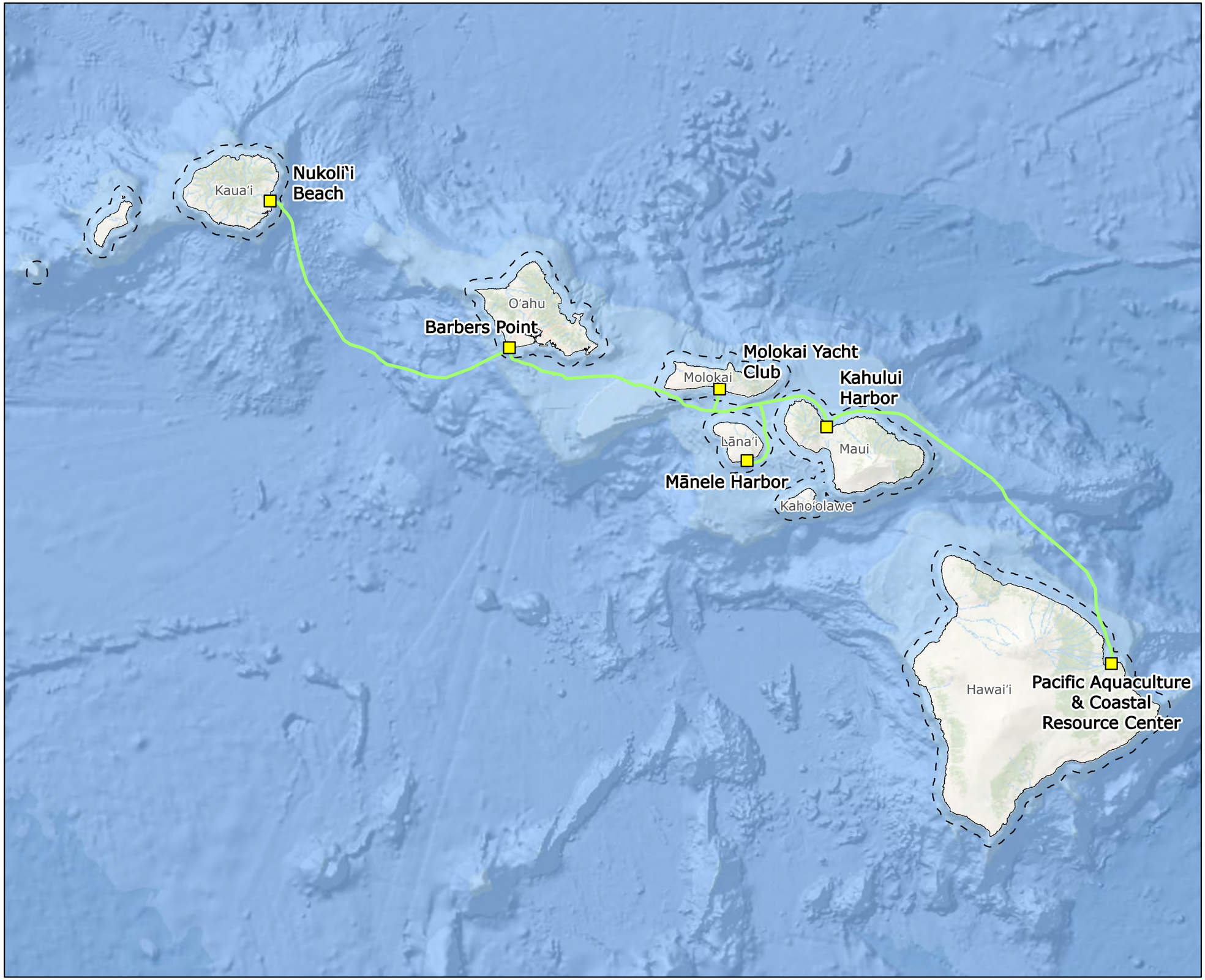
WPRFMC (Western Pacific Regional Fishery Management Council). 2020. Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region. Honolulu. Western Pacific Regional Fishery Management Council. 216 pp.

WRCC (Western Regional Climate Center). 2025. Climate of Hawaii. Available: https://wrcc.dri.edu/Climate/narrative_hi.php

Young, N.C., Brower, A.A., Muto, M.M., Freed, J.C., Angliss, R.P., Friday, N.A., Birkemeier, B.D., Boveng, P.L., Brost, B.M., Cameron, M.F. and Crance, J.L., 2024. Alaska marine mammal stock assessments, 2023. Humpback Whale ((*Megaptera novaeangliae kuzira*) – Hawai'i Stock. NOAA Technical Report NOAA-TM-AFSC-474 Available online: https://www.fisheries.noaa.gov/s3/2023-08/Humpback-Whale-Hawaii-2022-0.pdf.

Zoidis, A.M., Lomac-MacNair, K.S., Chomos-Betz, A.E., Day, A.J. and Sasha McFarland, A. 2014. Effects of sex, seasonal period, and sea state on calf behavior in Hawaiian humpback whales (*Megaptera novaeangliae*). *Aquatic Mammals*, *40*(1).

FIGURES

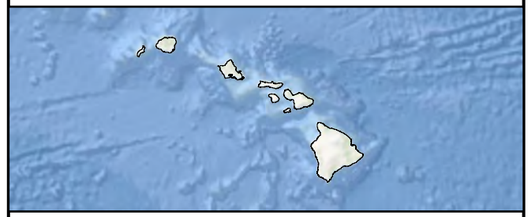


Hawaiian Islands Fiber Link

Figure 1
Project Overview

- Cable Landing Site
- Subsea Cable
- State Waters Limits (3 nautical miles)

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 40 80 120
Kilometers

0 20 40 60
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, NOAA, Esri, et. al.

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\1_2_ProjectOverviews\ONI_HIFL_DraftEA_ProjectOverview_20251112.aprx

Hawaiian Islands Fiber Link

Figure 2
Project Overview:
Subsea Cable Segments

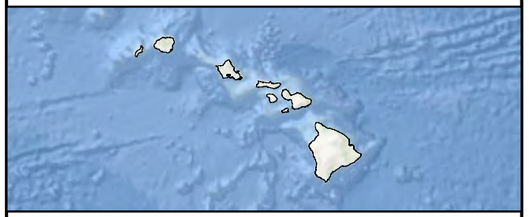
Nukoli`i Beach
Kaua'i
O'ahu
Barbers Point
Molokai Yacht Club
Molokai
Kahului Harbor
Lāna'i
Maui
Mānele Harbor
Kaho'olawe
Hawai'i
Pacific Aquaculture & Coastal Resource Center

Cable Landing Site
State Waters Limits (3 nautical miles)

Subsea Cable

- Segment 1
- Segment 2
- Segment 2A
- Segment 2B
- Segment 3

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 40 80 120
Kilometers

0 20 40 60
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, NOAA, Esri, et. al.

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\1_2_ProjectOverviews\ONI_HIFL_DraftEA_ProjectOverview_20251112.aprx



Hawaiian Islands Fiber Link

Figure 3.1
Kaua'i Cable Landing Site

- Project Area
- Approximate Construction Work Area

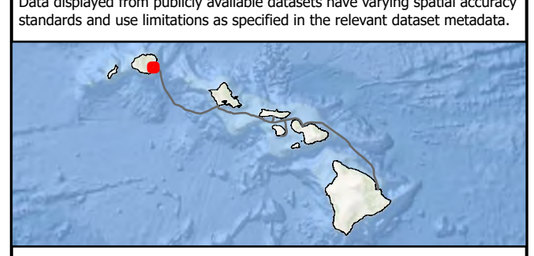
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 1)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System
- Third-Party Underground Conduit

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1 1.5
Kilometers

0 2,000 4,000
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20251107.aprx

Hawaiian Islands Fiber Link

Figure 3.1a

Kaua'i Cable Landing Site: Cable Landfall



- Project Area
- Approximate Construction Work Area
- TMK Parcel

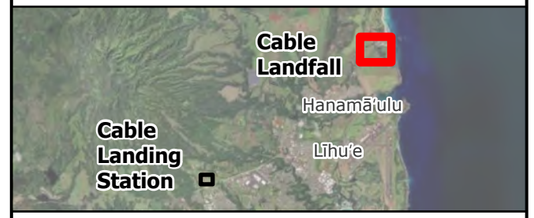
Proposed Project Infrastructure

- Beach Manhole
- Transition Between Project Infrastructure and Third-Party Infrastructure
- Borehole
- Subsea Cable (Segment 1)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System
- Third-Party Underground Conduit

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1 0.15
Kilometers

0 200 400
Feet

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20251107.aprx



Hawaiian Islands Fiber Link

Figure 3.1b

Kauaʻi Cable Landing Site: Cable Landing Station

Project Area

TMK Parcel

Proposed Project Infrastructure

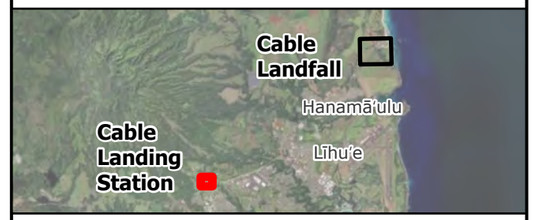
Cable Landing Station

Emergency Generator

Third-Party Infrastructure

Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05
Kilometers

0 200
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20251107.aprx



Hawaiian Islands Fiber Link

Figure 3.2
O'ahu Cable Landing Site

- Project Area
- Approximate Construction Work Area

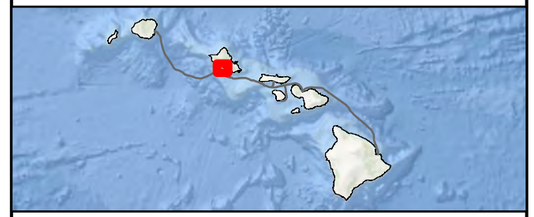
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Utility Access Point
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 1)
- Subsea Cable (Segment 2)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1 2 4
Kilometers

0 5,000 10,000
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_ DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20251107.aprx



Hawaiian Islands Fiber Link

Figure 3.2a

O'ahu Cable Landing Site: Cable Landfall

- Project Area
- Approximate Construction Work Area
- TMK Parcel

Proposed Project Infrastructure

- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 1)
- Subsea Cable (Segment 2)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.025 0.05
Kilometers

0 50 100 150
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

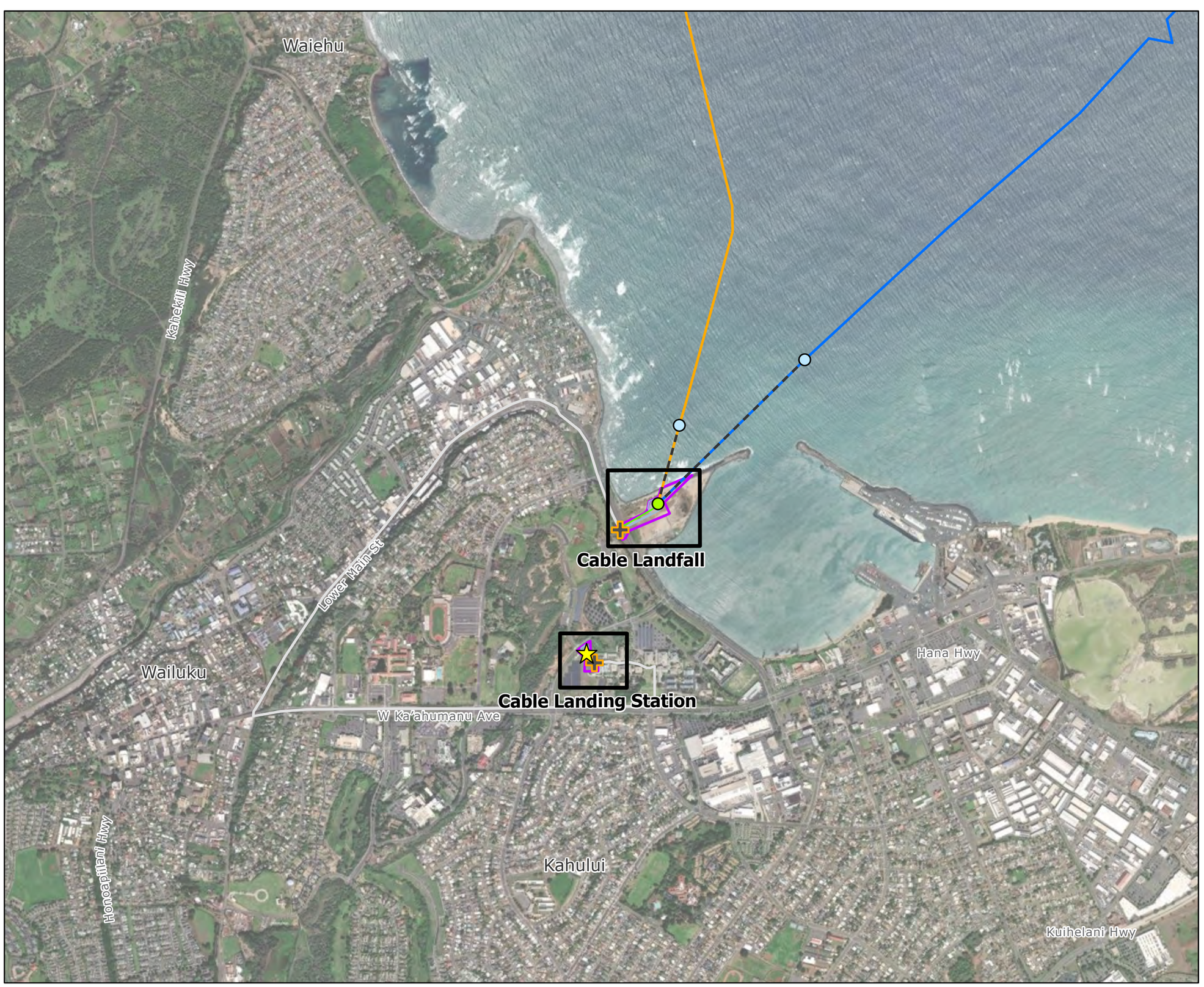
Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_Draft\EA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20251107.aprx

Hawaiian Islands Fiber Link

Figure 3.3
Maui Cable Landing Site



- Project Area
- Approximate Construction Work Area

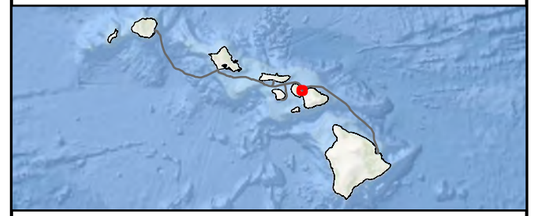
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.25 0.5 0.75 1
Kilometers

0 1,000 2,000 3,000
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 01/2026

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworks\nc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20260116.aprx



Hawaiian Islands Fiber Link

Figure 3.3a
Maui Cable Landing Site: Cable Landfall

- Project Area
- Approximate Construction Work Area
- TMK Parcel

Proposed Project Infrastructure

- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.02 0.04 0.06 0.08
Kilometers

0 75 150 225
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

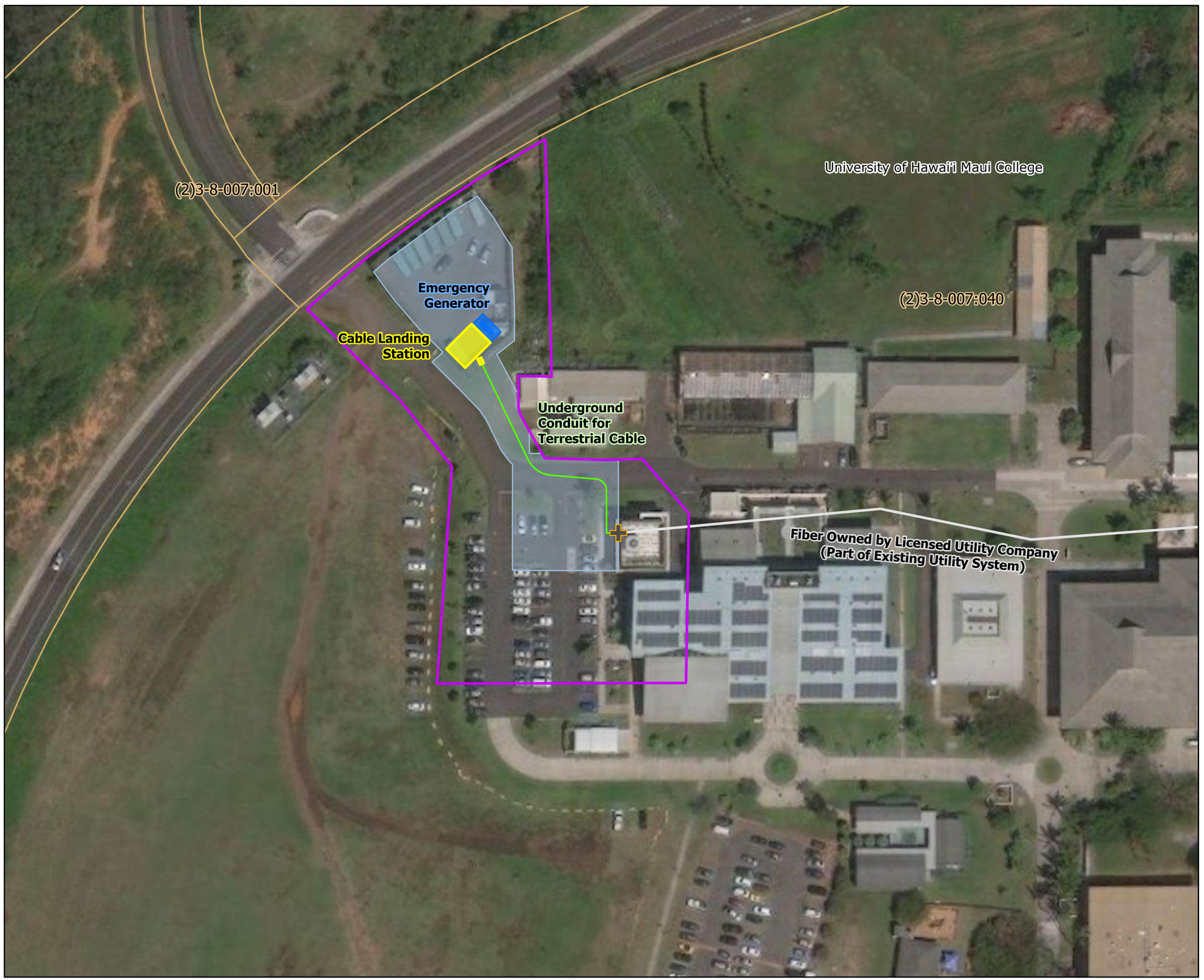
Date: 01/2026

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20260116.aprx



Hawaiian Islands Fiber Link

Figure 3.3b
Maui Cable Landing Site: Cable Landing Station

- Project Area
- Approximate Construction Work Area
- TMK Parcel

Proposed Project Infrastructure

- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Emergency Generator
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.02 0.04 0.06
Kilometers

0 75 150
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 01/2026

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt-local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20260116.aprx



Hawaiian Islands Fiber Link

Figure 3.4
Molokai Cable Landing Site

- Project Area
- Approximate Construction Work Area

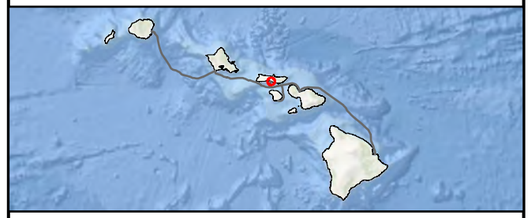
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2A)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.2 0.4 0.6
Kilometers

0 500 1,000
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksIncHawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20251107.aprx

Hawaiian Islands Fiber Link

Figure 3.4a

Molokai Cable Landing Site: Cable Landfall



- Project Area
- Approximate Construction Work Area
- TMK Parcel

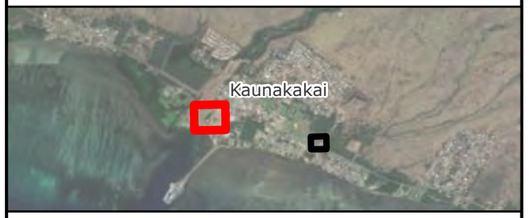
Proposed Project Infrastructure

- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 2A)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.02 0.04 0.06
Kilometers

0 50 100 150
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20251107.aprx



Hawaiian Islands Fiber Link

Figure 3.4b

Molokai Cable Landing Site: Cable Landing Station

- Project Area
- TMK Parcel

Proposed Project Infrastructure

- Utility Connection Point
- Cable Landing Station
- Emergency Generator
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.02
Kilometers

0 50
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

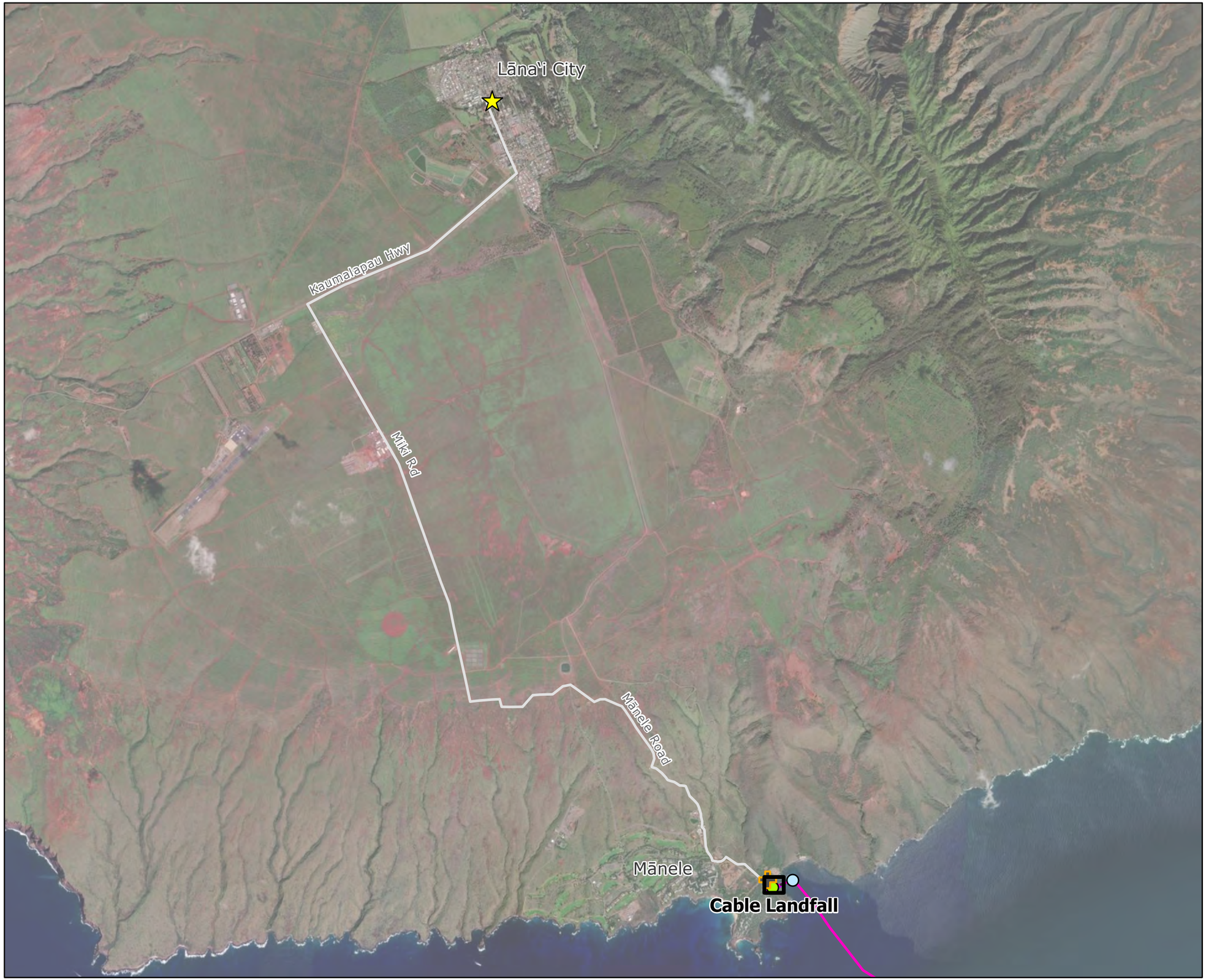
Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20251107.aprx



Hawaiian Islands Fiber Link

Figure 3.5
Lānaʻi Cable Landing Site

- Project Area
- Approximate Construction Work Area

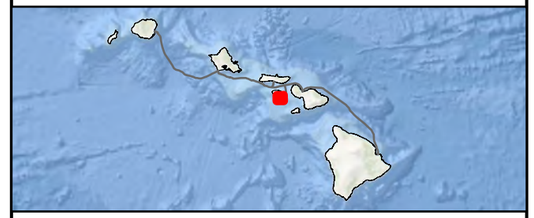
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2B)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1 2
Kilometers

0 3,000 6,000
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 01/2026

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20260116.aprx



Hawaiian Islands Fiber Link

Figure 3.5a

Lānaʻi Cable Landing Site: Cable Landfall

- Project Area
- Approximate Construction Work Area
- TMK Parcel

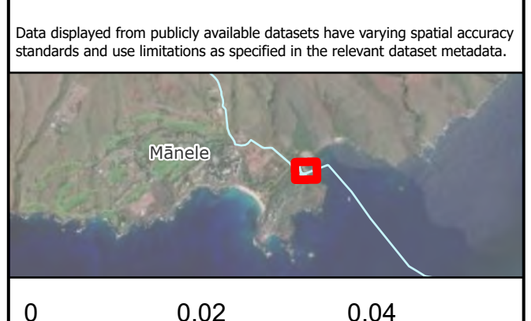
Proposed Project Infrastructure

- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 2B)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.02 0.04
Kilometers

0 50 100
Feet

N W E S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 01/2026

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20260116.aprx



Hawaiian Islands Fiber Link

Figure 3.6
Hawai'i Island Cable Landing Site

- Project Area
- Approximate Construction Work Area

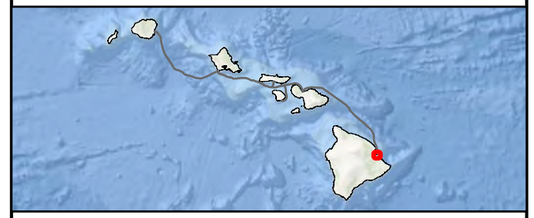
Proposed Project Infrastructure

- Beach Manhole
- Cable Landing Station
- Seabed Punchout Point
- Transition Between New Underground Conduit and Existing Utility System
- Utility Connection Point
- Borehole
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.25 0.5 1
Kilometers

0 1,500 3,000
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 01/2026

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksIncHawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20260116.aprx



Hawaiian Islands Fiber Link

Figure 3.6a

Hawai'i Island Cable Landing Site: Cable Landfall

- Project Area
- Approximate Construction Work Area
- TMK Parcel

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.02 0.04 0.06 0.08
Kilometers

0 50 100 150 200
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 01/2026

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

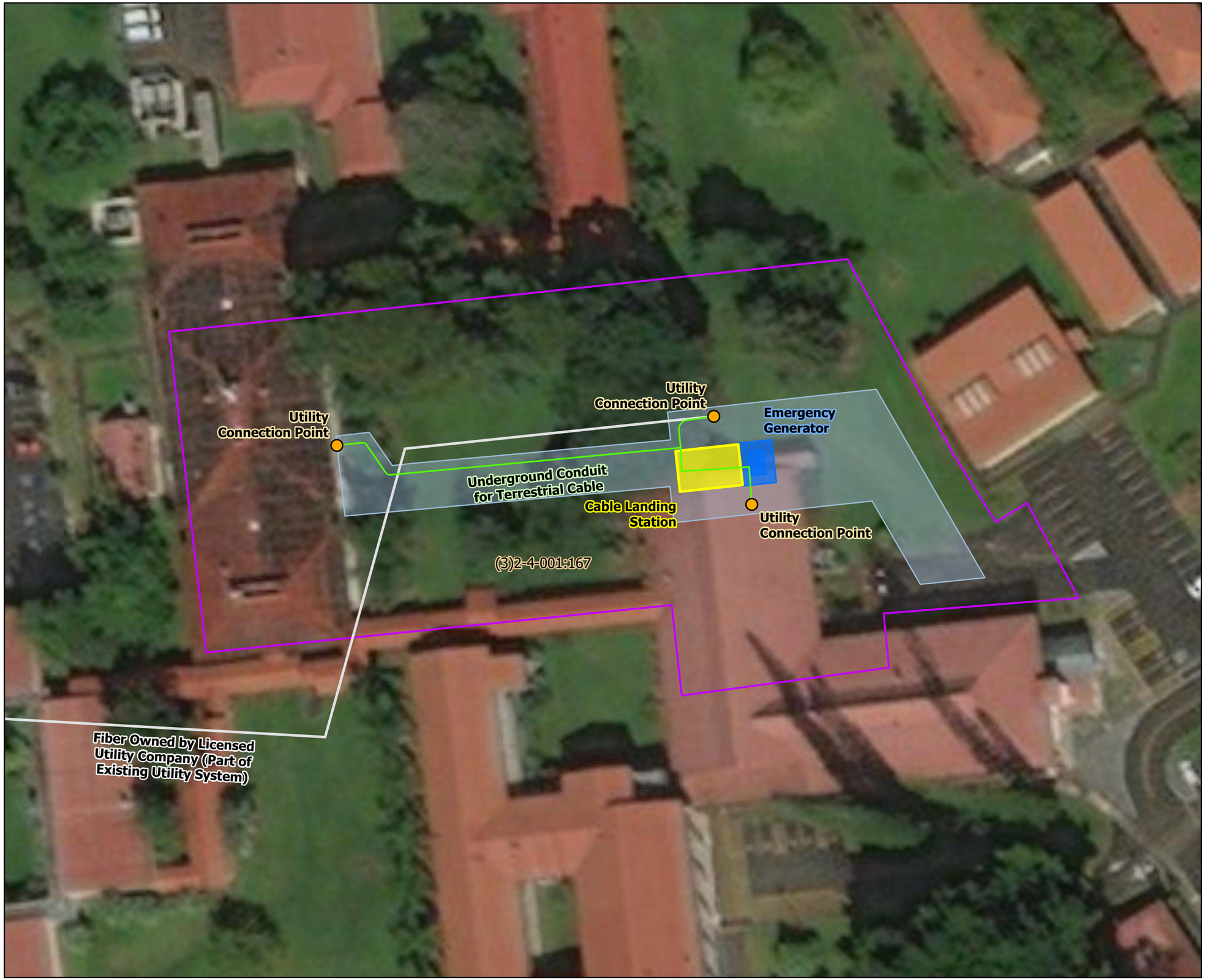
Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworks\Incl\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20260116.aprx

Hawaiian Islands Fiber Link

Figure 3.6b

Hawai'i Island Cable Landing Site: Cable Landing Station



- Project Area
- Approximate Construction Work Area
- TMK Parcel

Proposed Project Infrastructure

- Utility Connection Point
- Cable Landing Station
- Emergency Generator
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.02
Kilometers

0 50
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

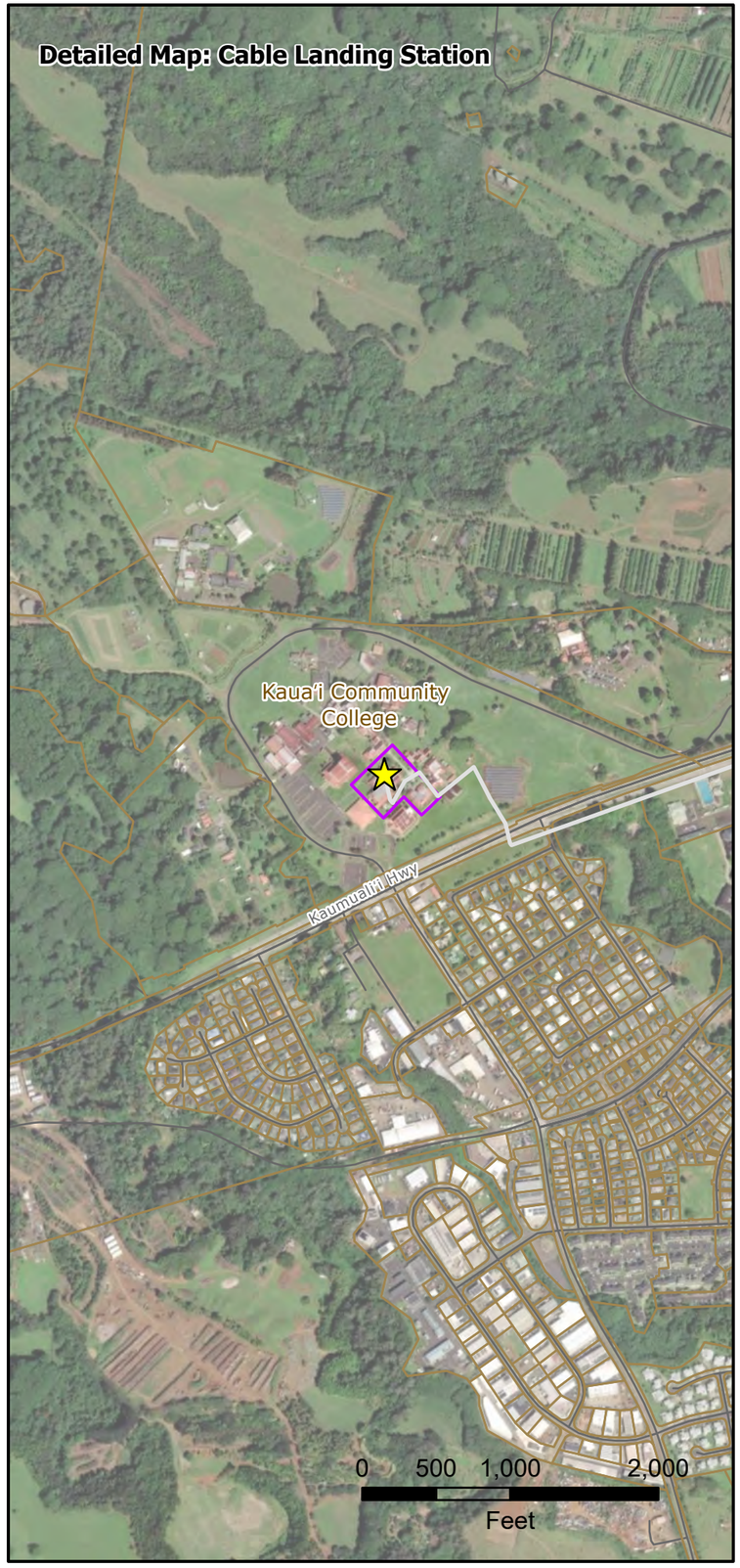
Date: 01/2026

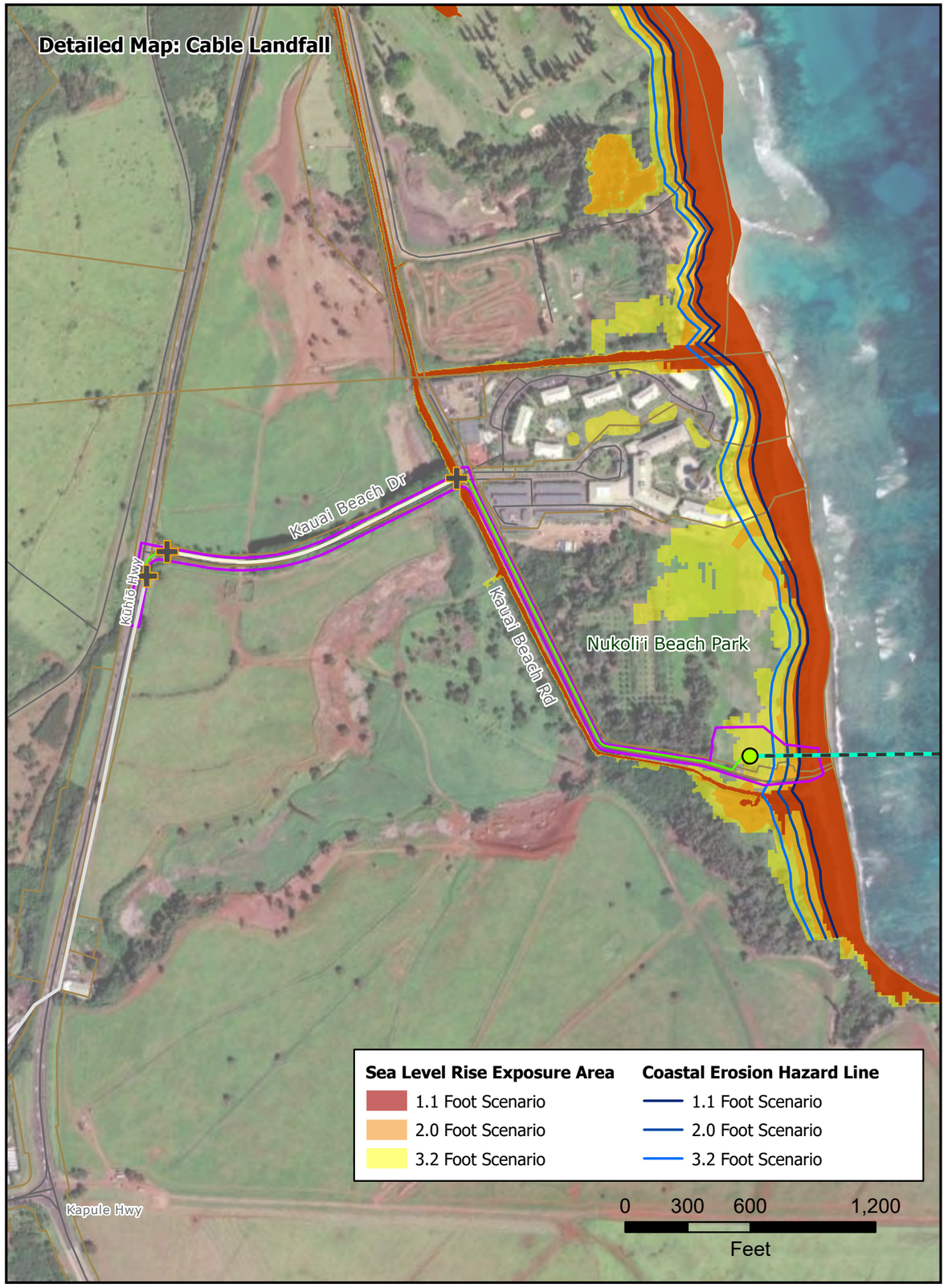
Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\4_Cable_Landing_Site_Layout\ONI_HIFL_DraftEA_CableLandingSiteLayout_20260116.aprx





Hawaiian Islands Fiber Link

Figure 4.1

Kaua'i Cable Landing Site: Sea Level Rise Exposure Areas

- Project Area
- TMK Parcel
- Roads

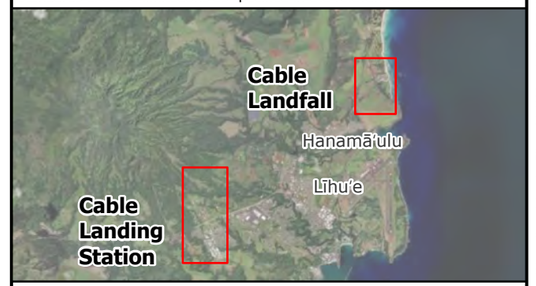
Proposed Project Infrastructure

- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 1)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System
- Third-Party Underground Conduit

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

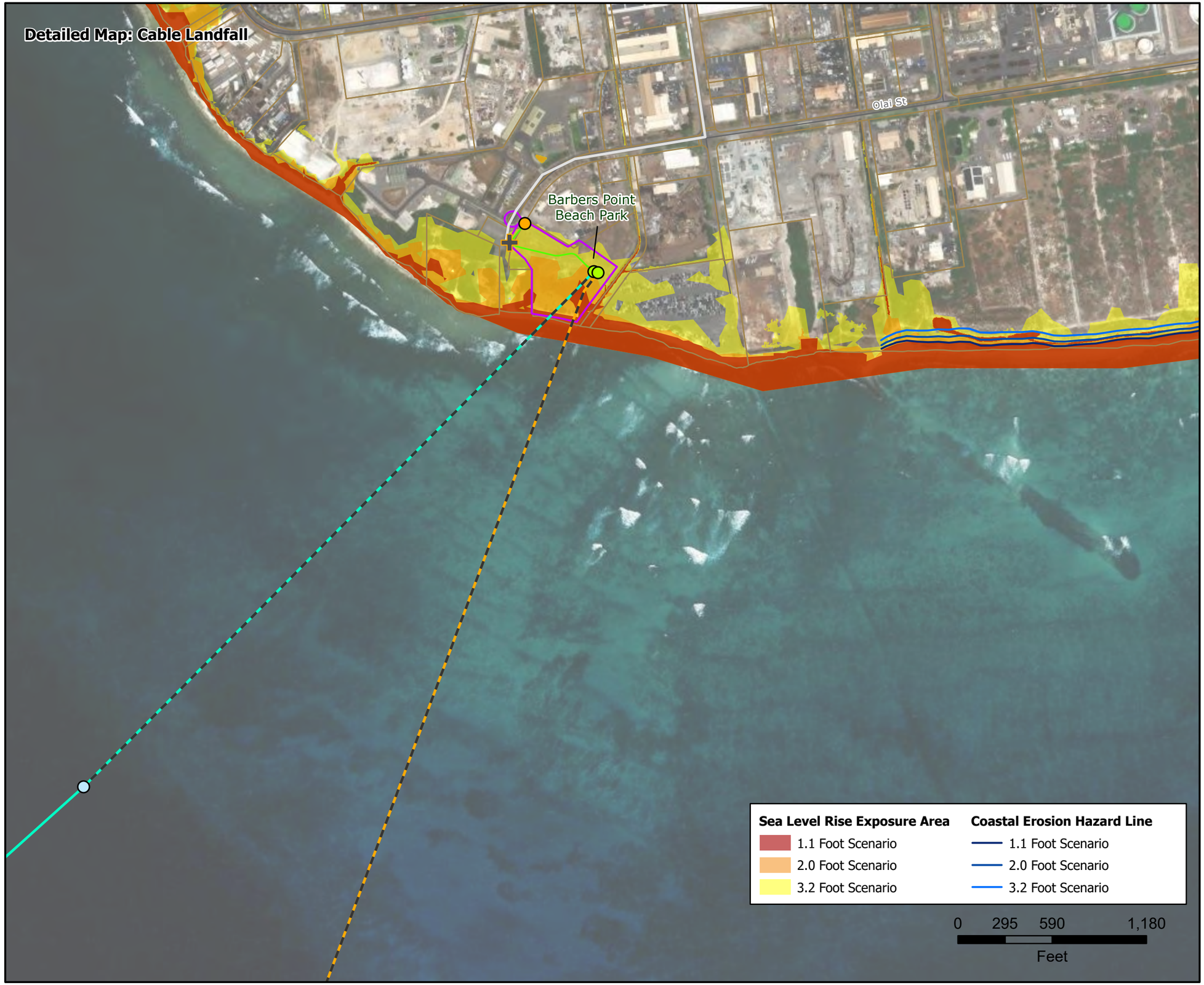
Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\5_SeaLevelRise_ExposureAreas\ONI_HIFL_DraftEA_SeaLevelRiseExposureAreas_20251112.aprx



Hawaiian Islands Fiber Link

Figure 4.2

Oʻahu Cable Landing Site: Sea Level Rise Exposure Areas

- Project Area
- TMK Parcel
- Roads

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 1)
- Subsea Cable (Segment 2)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 2 4 8
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

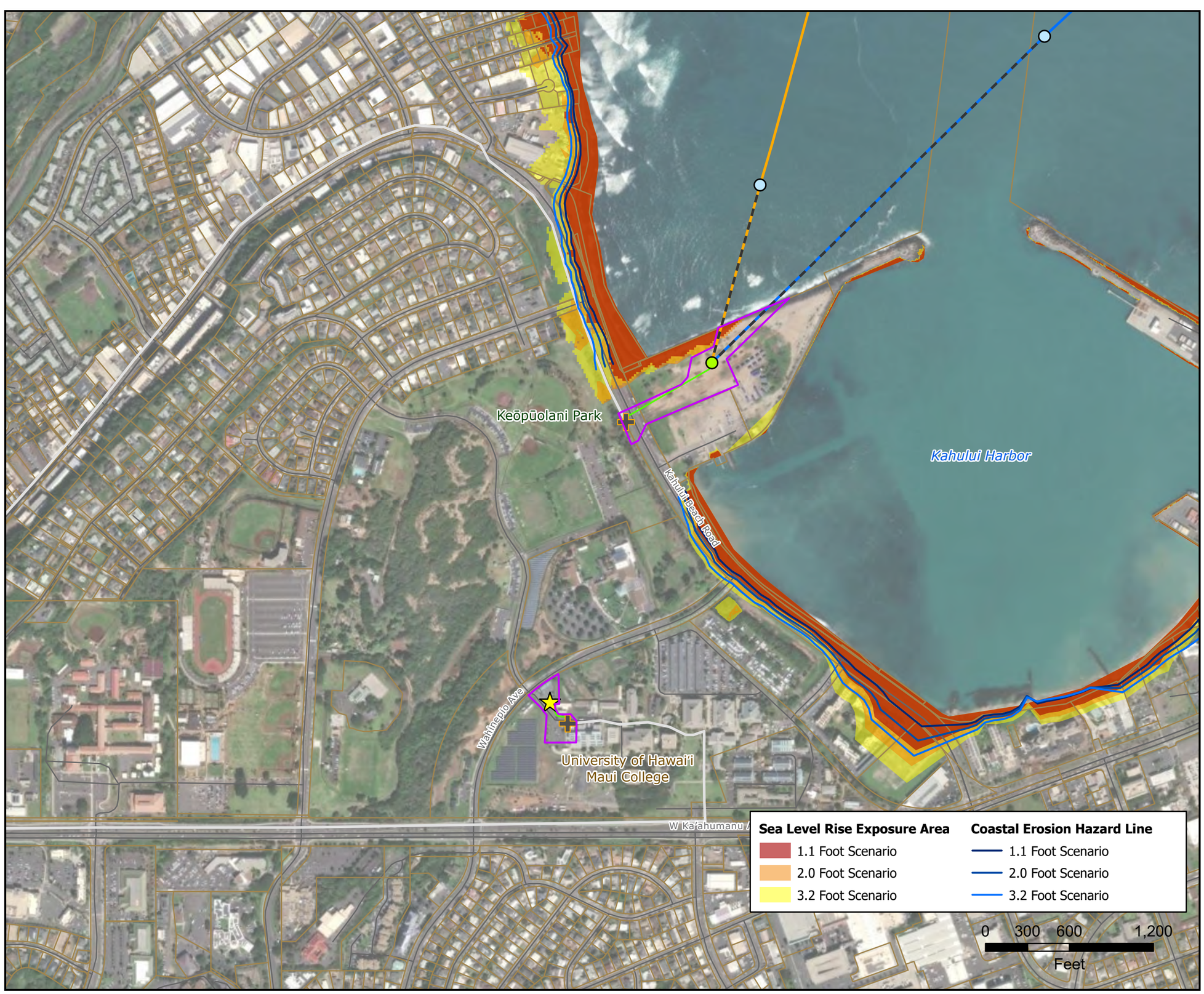
Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\5_SeaLevelRise_ExposureAreas\ONI_HIFL_DraftEA_SeaLevelRiseExposureAreas_20251112.aprx

Hawaiian Islands Fiber Link

Figure 4.3
Maui Cable Landing Site: Sea Level Rise Exposure Areas



- Project Area
- TMK Parcel
- Roads

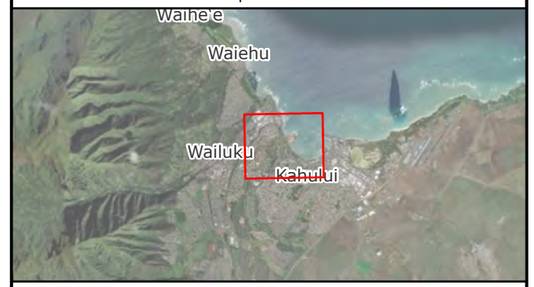
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

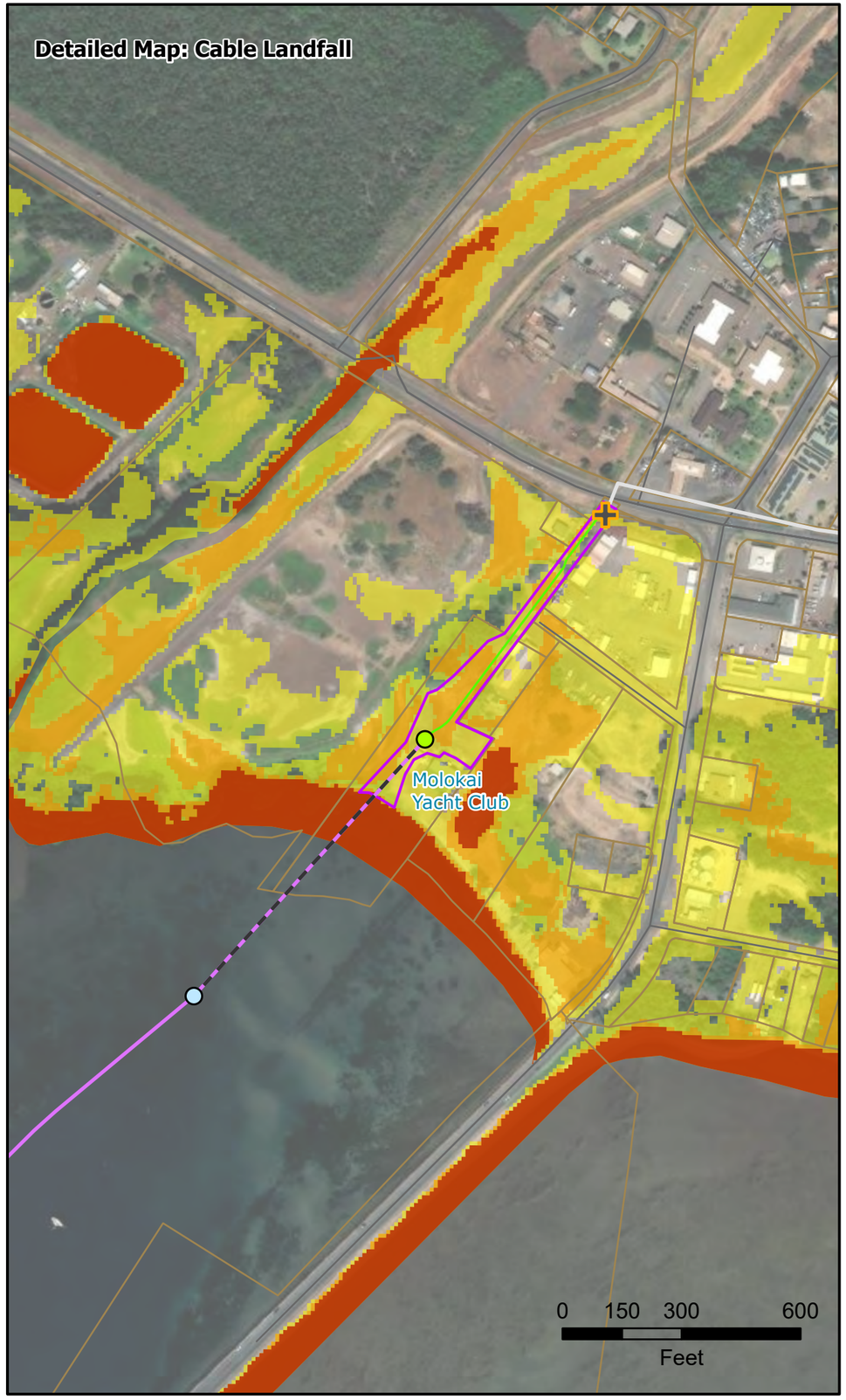
Date: 01/2026

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt-local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\...DraftEA\5_SeaLevelRise_ExposureAreas\ONI_HIFL_DraftEA_SeaLevelRiseExposureAreas_20260119.aprx





Hawaiian Islands Fiber Link

Figure 4.4

Molokai Cable Landing Site: Sea Level Rise Exposure Areas

- Project Area
- TMK Parcel
- Roads

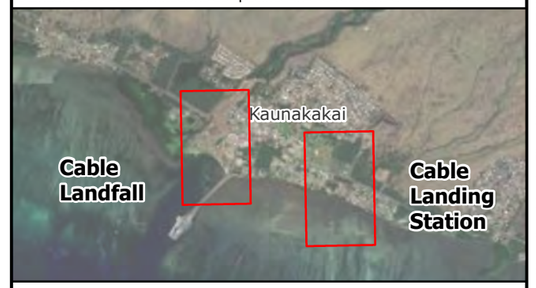
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2A)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1 2 Miles

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

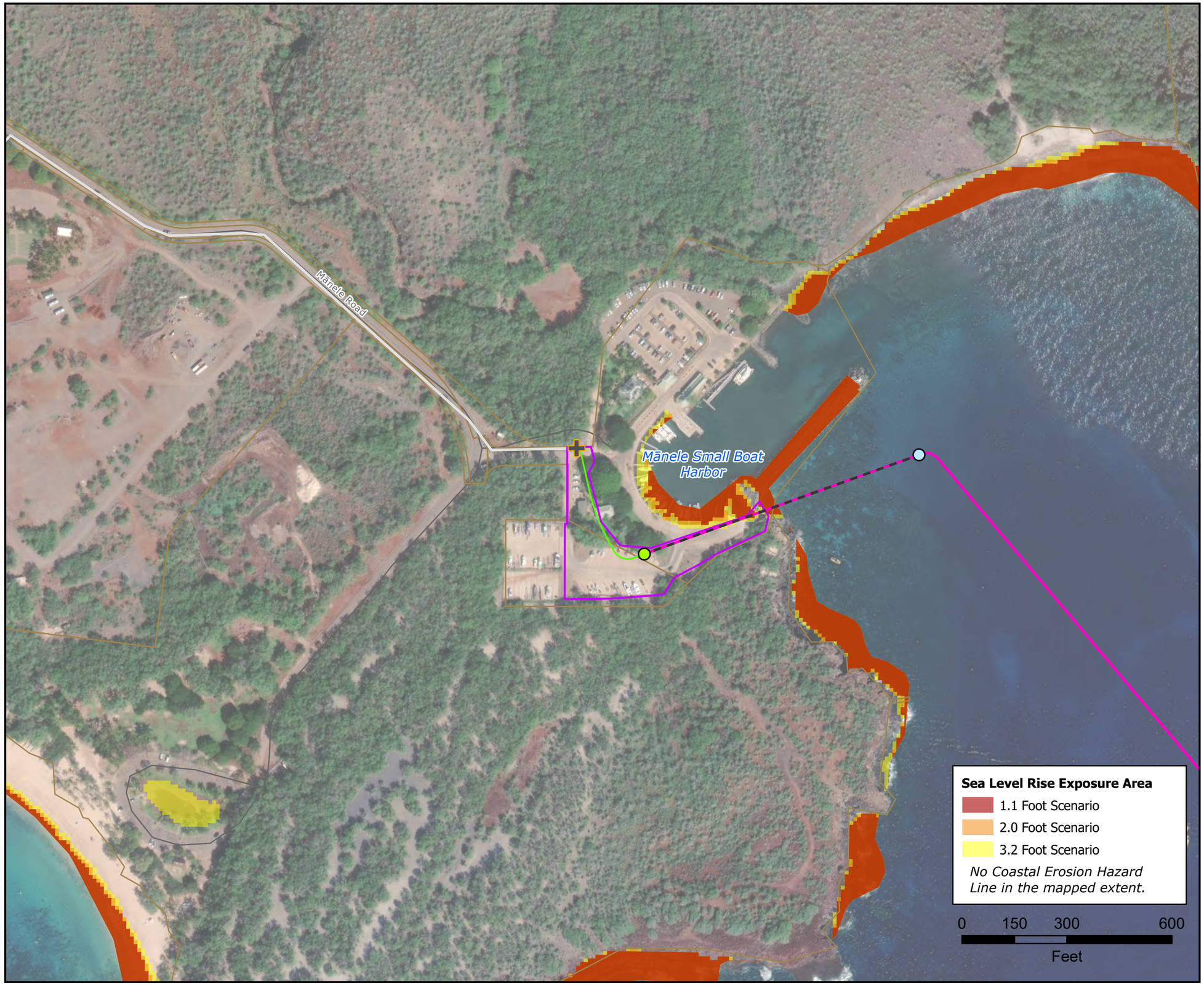
Not for Construction

Document Path: \\tt-local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\5_SeaLevelRise_ExposureAreas\ONI_HIFL_DraftEA_SeaLevelRiseExposureAreas_20251112.aprx

Hawaiian Islands Fiber Link

Figure 4.5

Lānaʻi Cable Landing Site: Sea Level Rise Exposure Areas



- Project Area
- TMK Parcel
- Roads

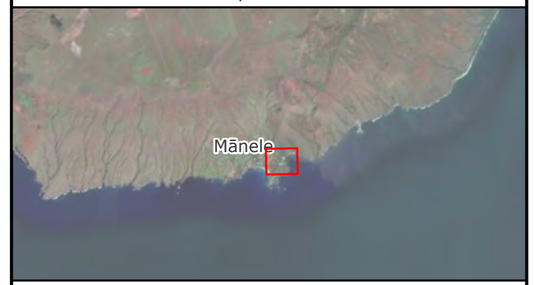
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 2B)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

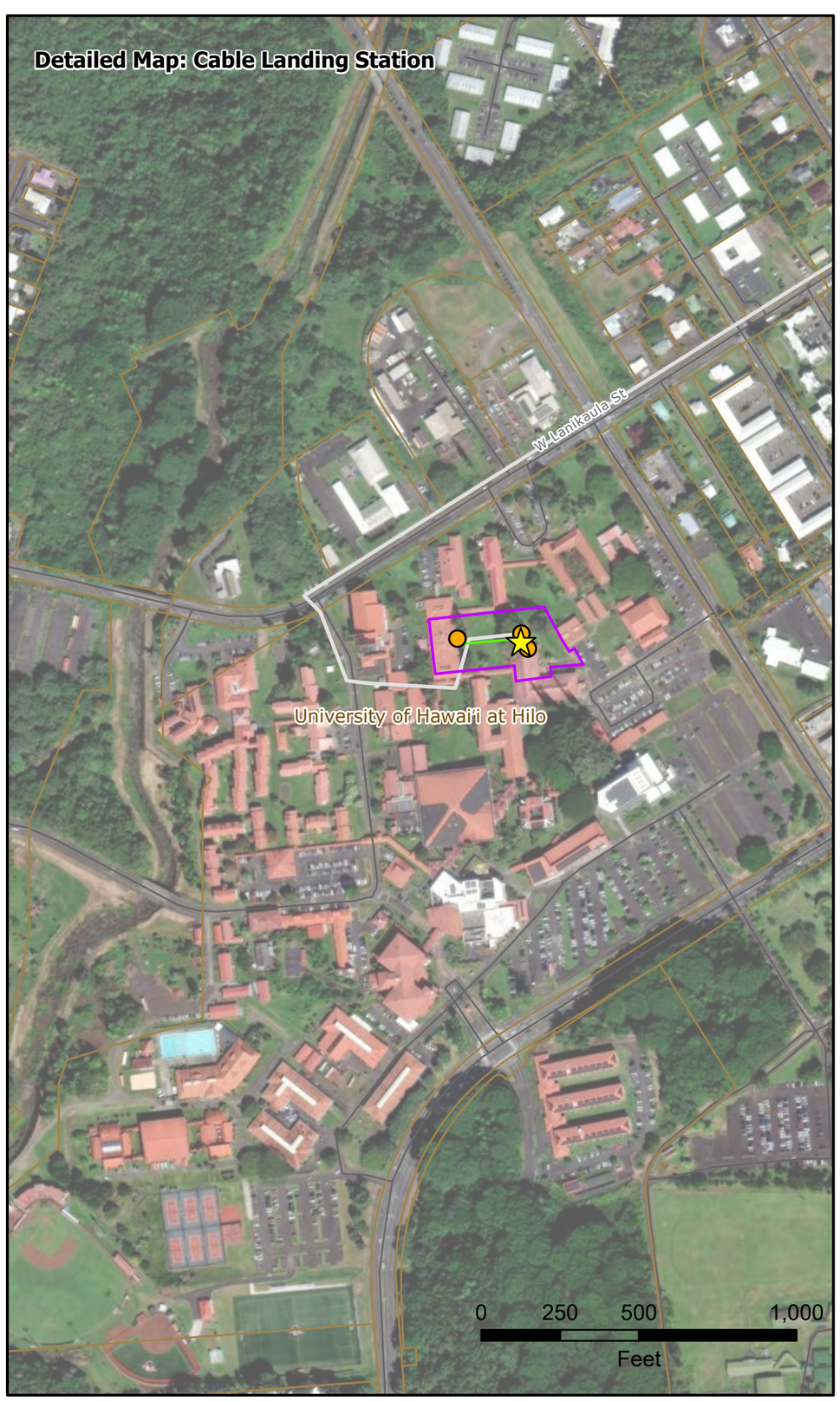
Date: 11/2025

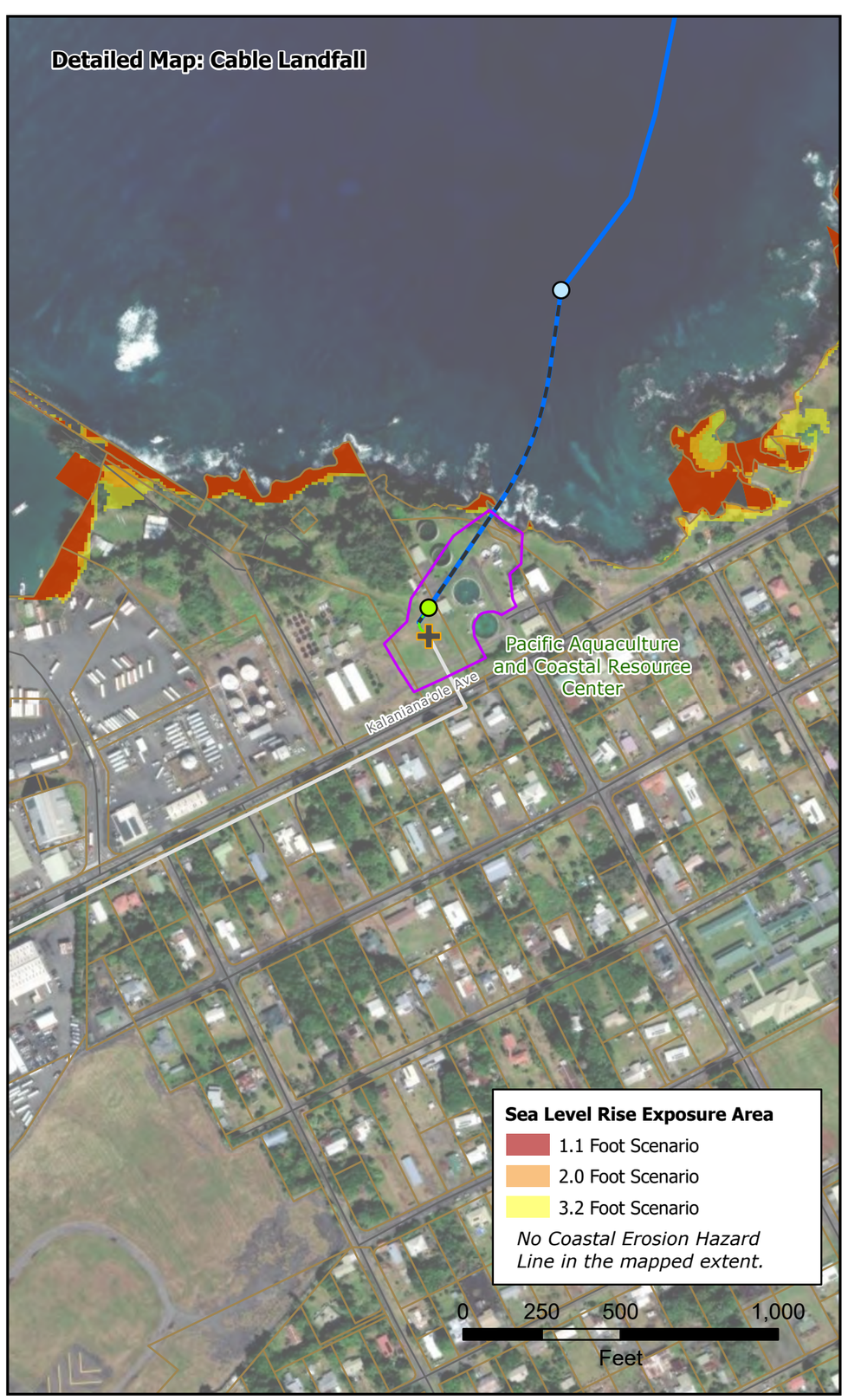
Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\5_SeaLevelRise_ExposureAreas\ONI_HIFL_DraftEA_SeaLevelRiseExposureAreas_20251112.aprx





Hawaiian Islands Fiber Link

Figure 4.6

Hawai'i Island Cable Landing Site: Sea Level Rise Exposure Areas

- Project Area
- TMK Parcel
- Roads

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 3)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1 2 4

Miles

N

W E

S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 12/2025

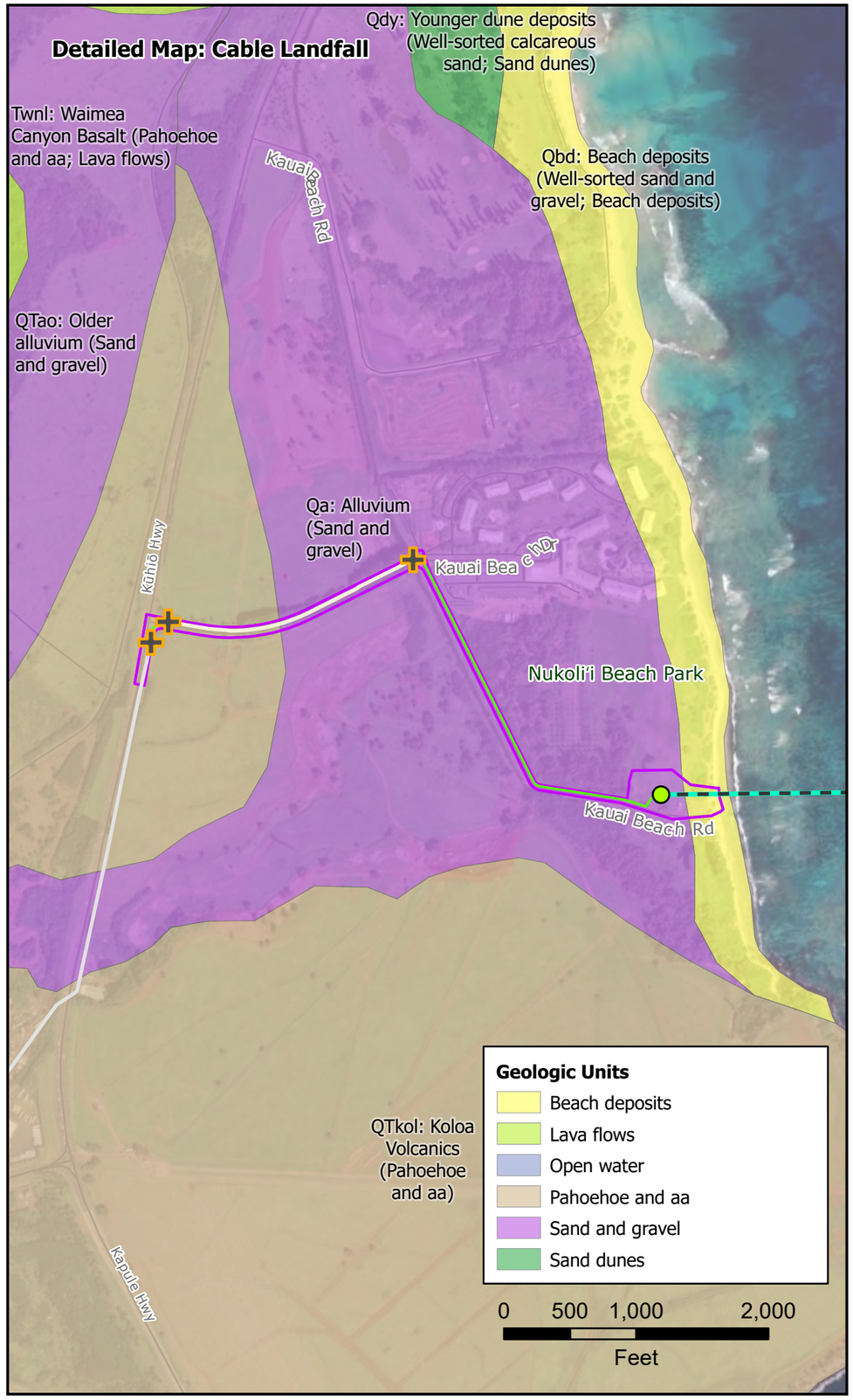
Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\...\HIFL_DraftEA\5_SeaLevelRise_ExposureAreas\ONI_HIFL_DraftEA_SeaLevelRiseExposureAreas_20251112.aprx





Hawaiian Islands Fiber Link

Figure 5.1

Kauaʻi Cable Landing Site: Regional Geology

Project Area

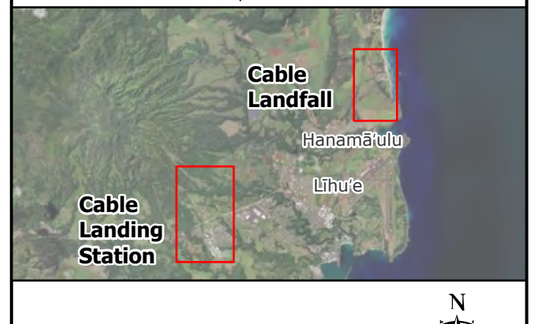
Proposed Project Infrastructure

- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 1)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System
- Third-Party Underground Conduit

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6

Miles

N W E S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\6_RegionalGeology\ONI_HIFL_DraftEA_RegionalGeology_20251113.aprx



Hawaiian Islands Fiber Link

Figure 5.2

O'ahu Cable Landing Site: Regional Geology

- Project Area

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 1)
- Subsea Cable (Segment 2)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

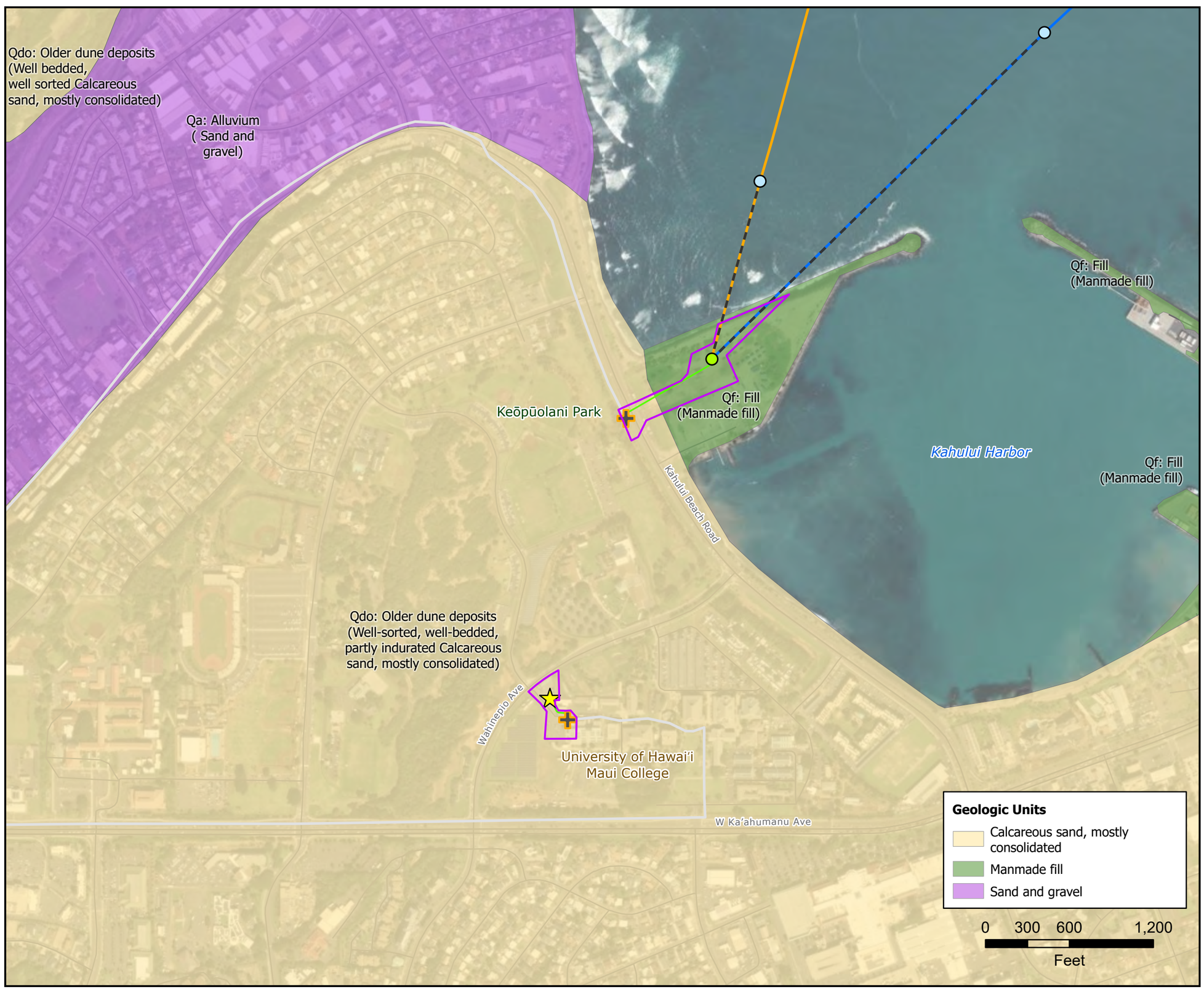
Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA\6_RegionalGeology\ONI_HIFL_DraftEA_RegionalGeology_20251113.aprx



Hawaiian Islands Fiber Link

Figure 5.3
Maui Cable Landing Site: Regional Geology

- Project Area

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

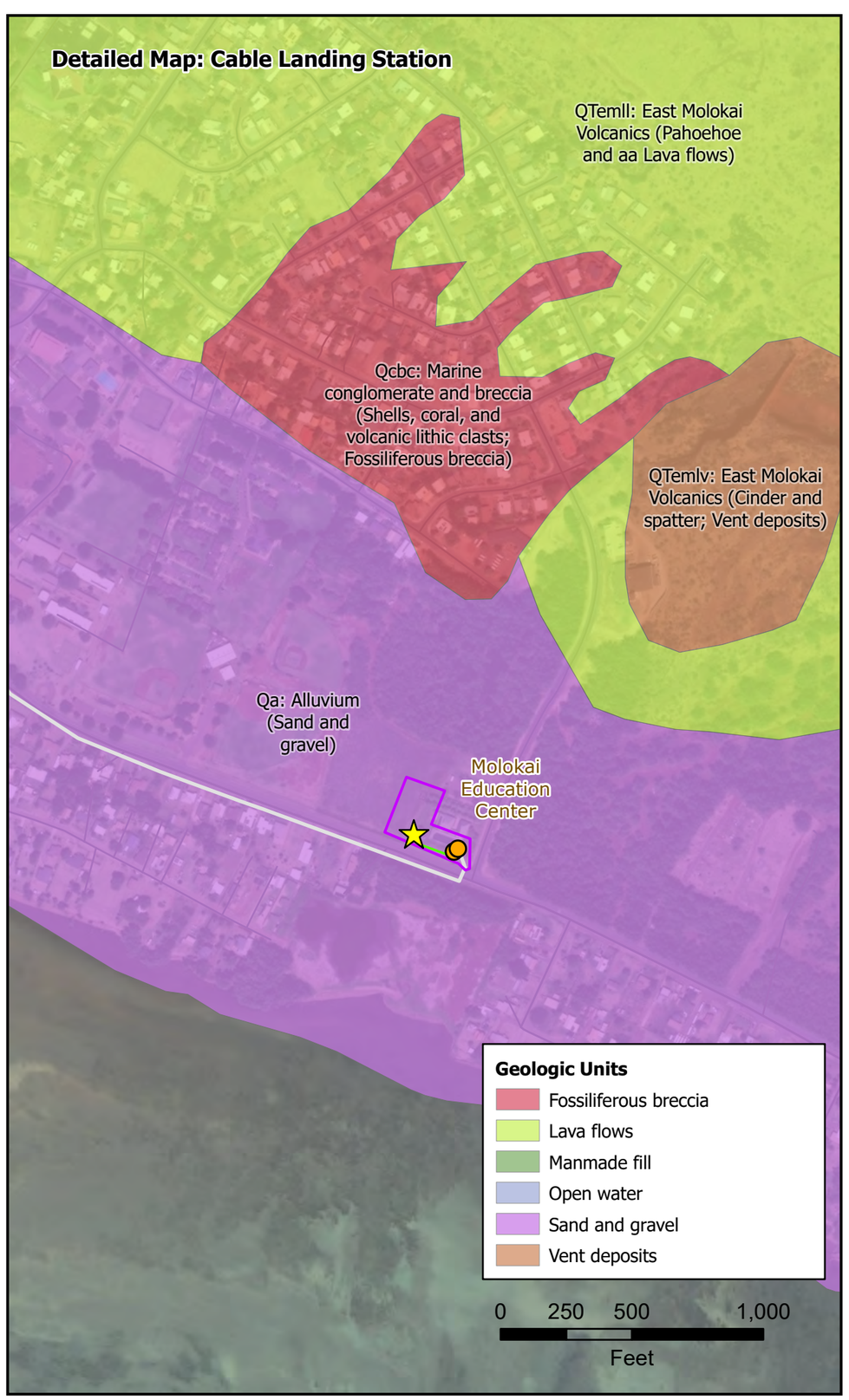
Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt-local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\6_RegionalGeology\ONI_HIFL_DraftEA_RegionalGeology_20251113.aprx





Hawaiian Islands Fiber Link

Figure 5.4

Molokai Cable Landing Site: Regional Geology

- Project Area

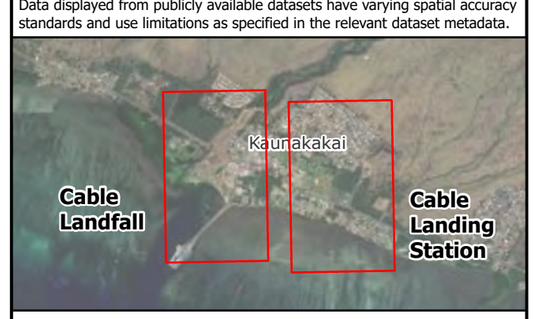
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2A)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1 2
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

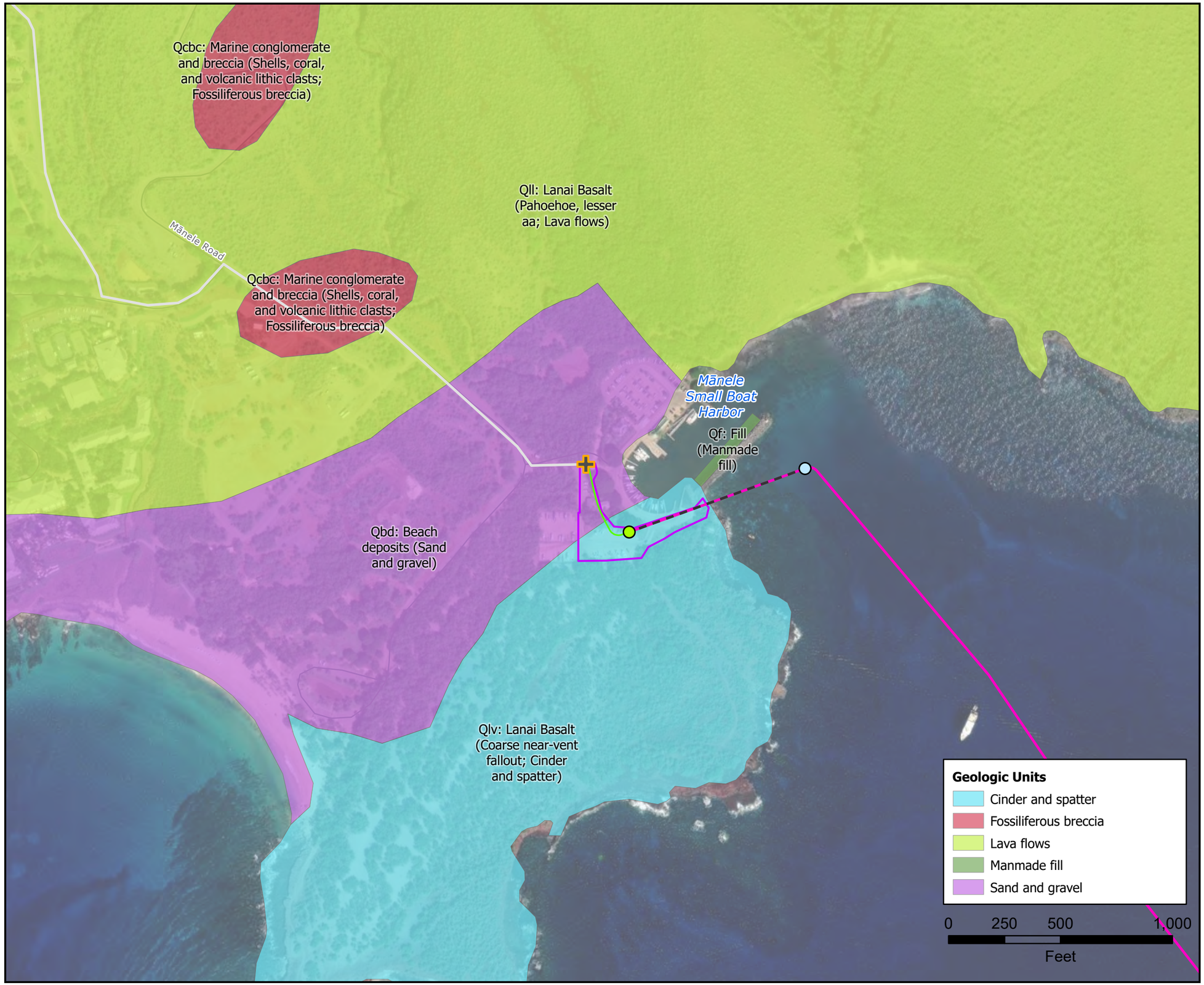
Not for Construction

Document Path: \\tt.local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA\6_RegionalGeology\ONI_HIFL_DraftEA_RegionalGeology_20251113.aprx

Hawaiian Islands Fiber Link

Figure 5.5

Lānaʻi Cable Landing Site: Regional Geology



- Project Area

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 2B)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

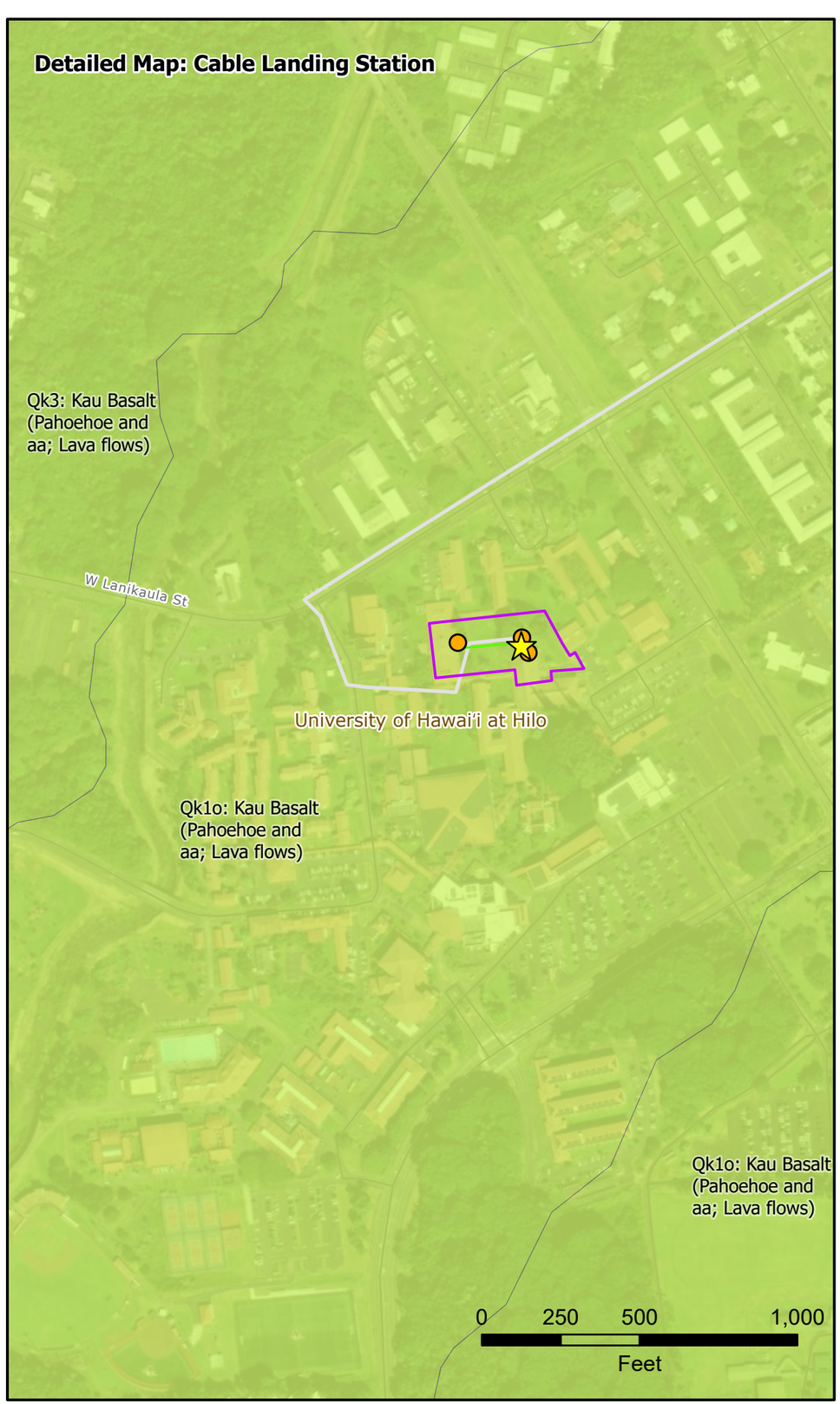
Date: 11/2025

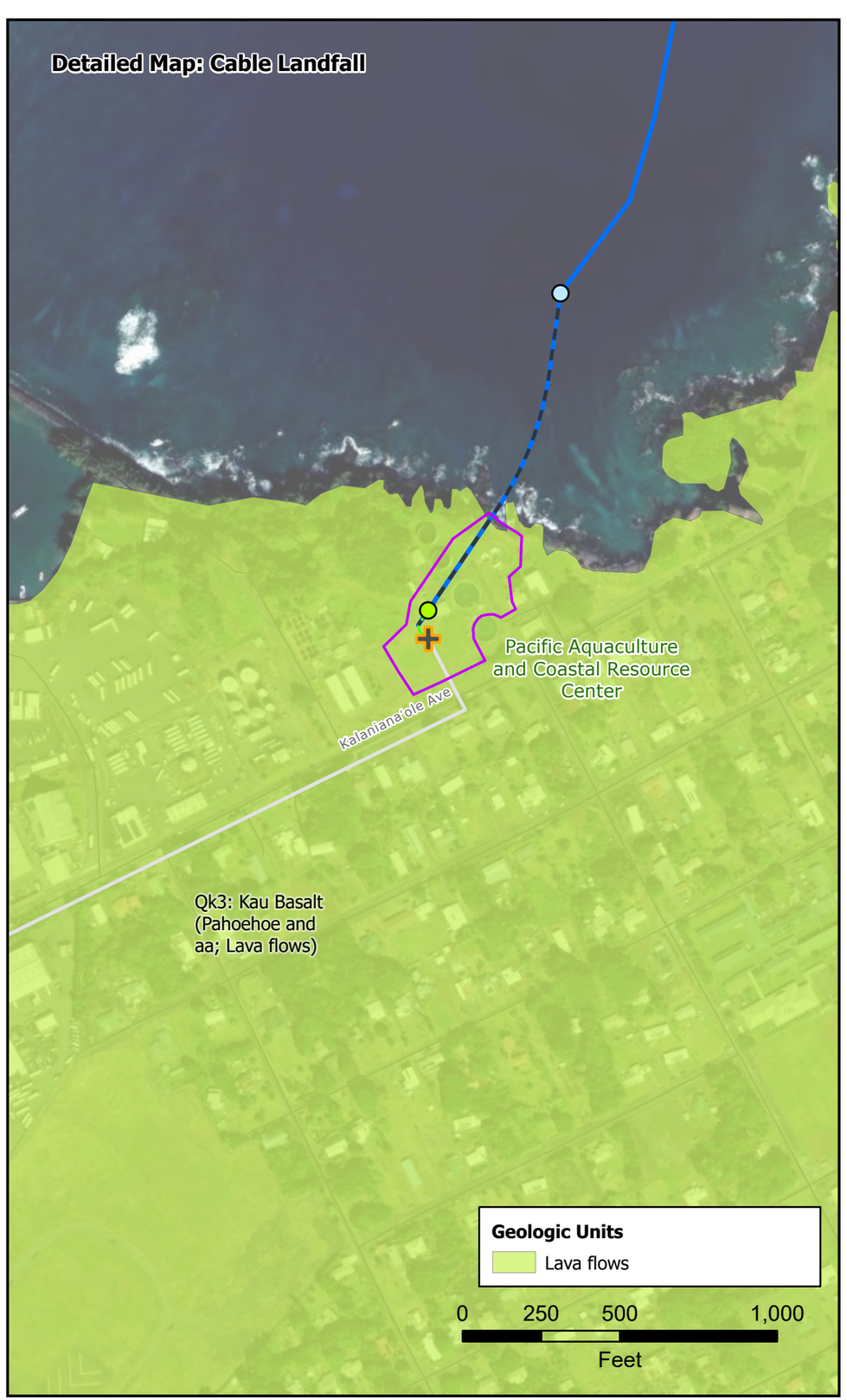
Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA\6_RegionalGeology\ONI_HIFL_DraftEA_RegionalGeology_20251113.aprx





Hawaiian Islands Fiber Link

Figure 5.6

Hawai'i Island Cable Landing Site: Regional Geology

Project Area

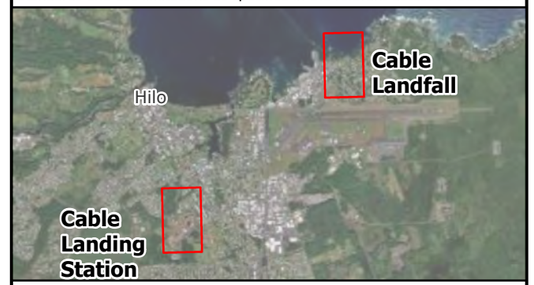
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 3)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1 2 4
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 12/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

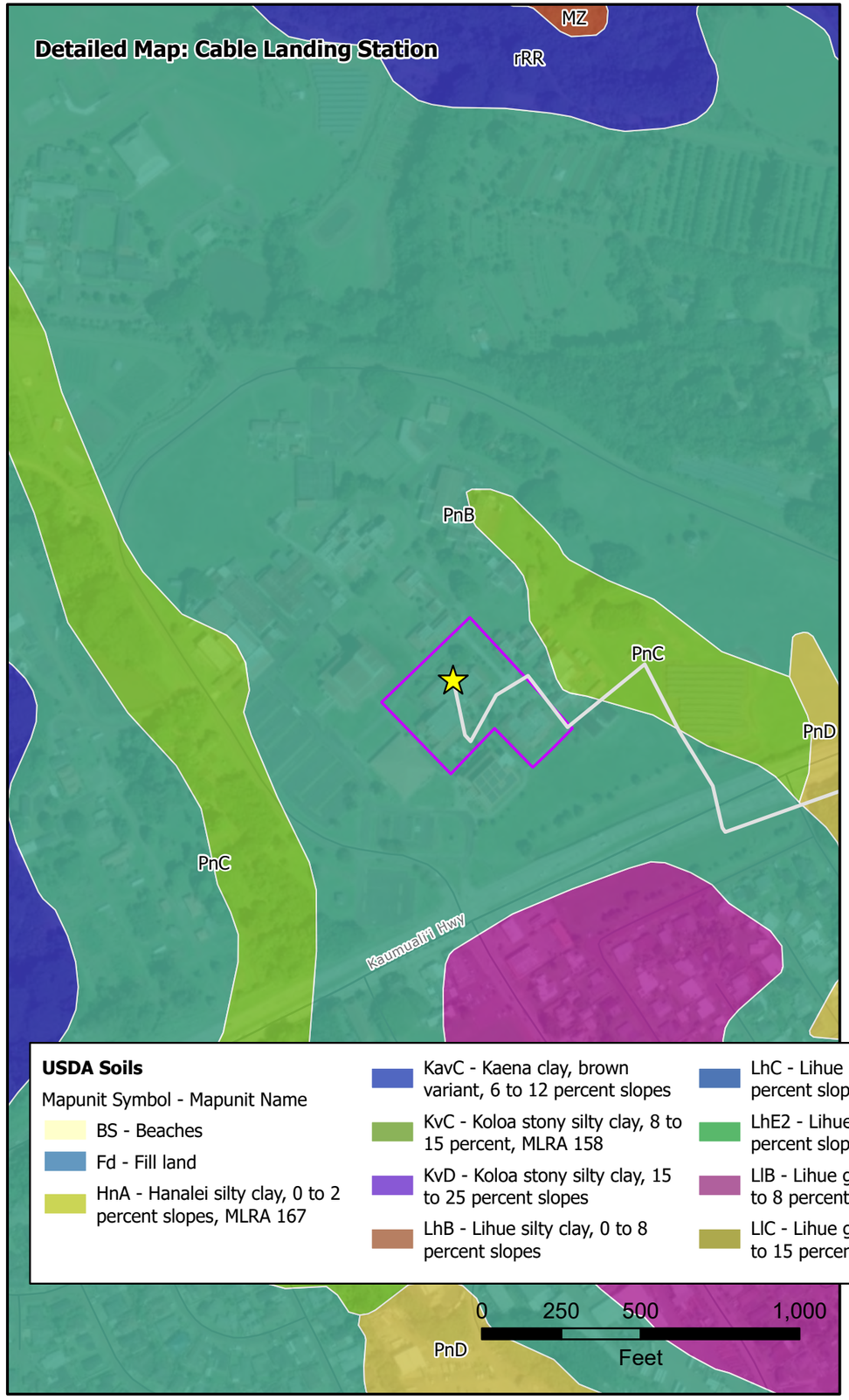
Not for Construction

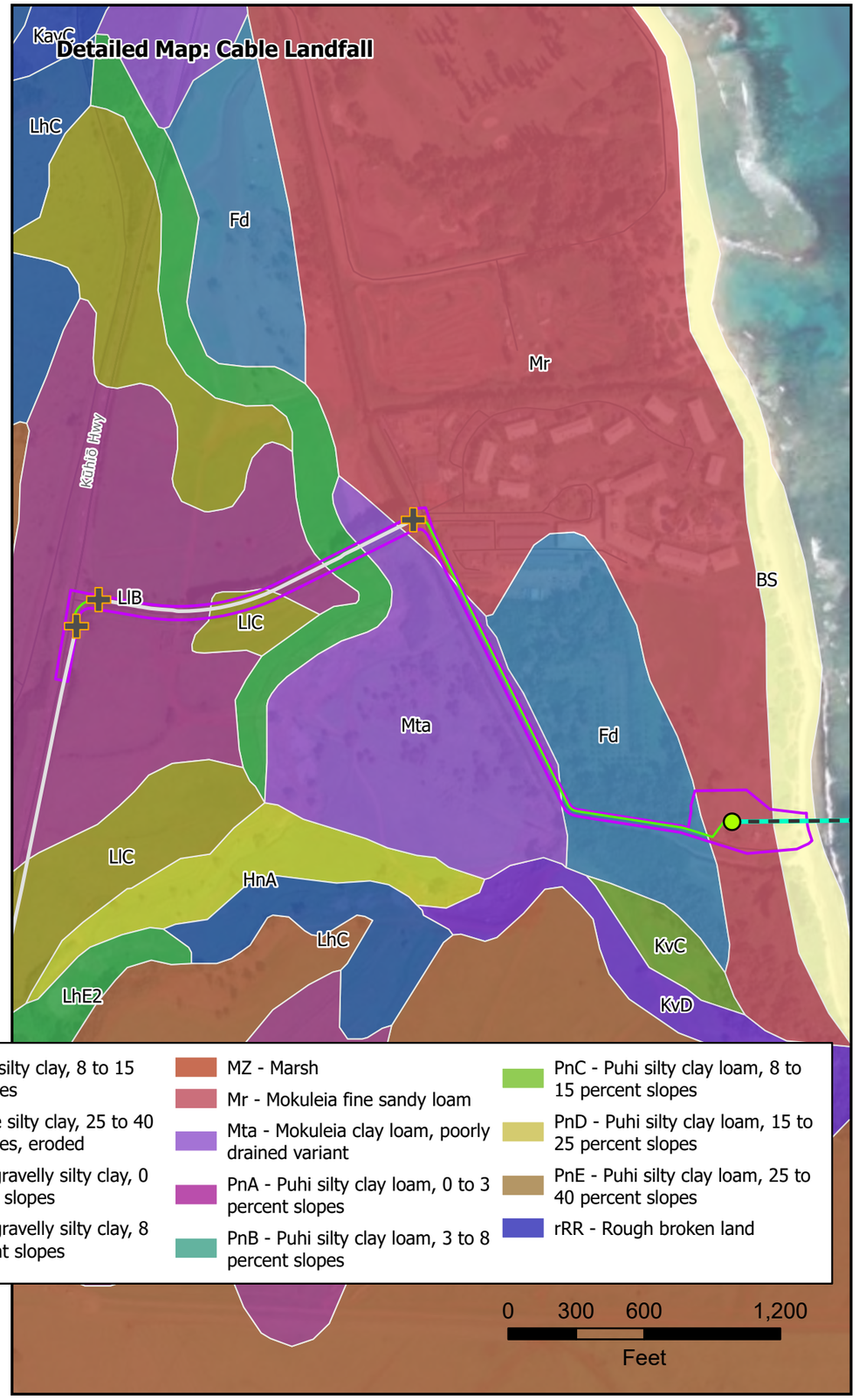
Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworks\Incl\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\6_RegionalGeology\ONI_HIFL_DraftEA_RegionalGeology_20251113.aprx

Hawaiian Islands Fiber Link

Figure 6.1

Kauaʻi Cable Landing Site: USDA Soils





USDA Soils

Mapunit Symbol - Mapunit Name

- BS - Beaches
- Fd - Fill land
- HnA - Hanalei silty clay, 0 to 2 percent slopes, MLRA 167
- KavC - Kaena clay, brown variant, 6 to 12 percent slopes
- KvC - Koloa stony silty clay, 8 to 15 percent, MLRA 158
- KvD - Koloa stony silty clay, 15 to 25 percent slopes
- LhB - Lihue silty clay, 0 to 8 percent slopes
- LhC - Lihue silty clay, 8 to 15 percent slopes
- LhE2 - Lihue silty clay, 25 to 40 percent slopes, eroded
- LIB - Lihue gravelly silty clay, 0 to 8 percent slopes
- LIC - Lihue gravelly silty clay, 8 to 15 percent slopes
- MZ - Marsh
- Mr - Mokuleia fine sandy loam
- Mta - Mokuleia clay loam, poorly drained variant
- PnA - Puhi silty clay loam, 0 to 3 percent slopes
- PnB - Puhi silty clay loam, 3 to 8 percent slopes
- PnC - Puhi silty clay loam, 8 to 15 percent slopes
- PnD - Puhi silty clay loam, 15 to 25 percent slopes
- PnE - Puhi silty clay loam, 25 to 40 percent slopes
- rRR - Rough broken land

Project Area

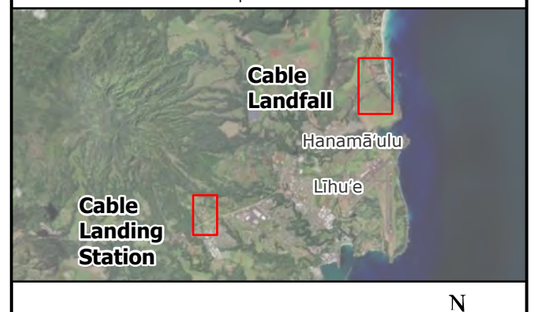
Proposed Project Infrastructure

- Beach Manhole
- Cable Landing Station
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 1)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6

Miles

N

W E

S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\7_USDA_Soils\ONI_HIFL_DraftEA_USDASoils_20251013.aprx



Hawaiian Islands Fiber Link

Figure 6.2

O'ahu Cable Landing Site: USDA Soils

- Project Area

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 1)
- Subsea Cable (Segment 2)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

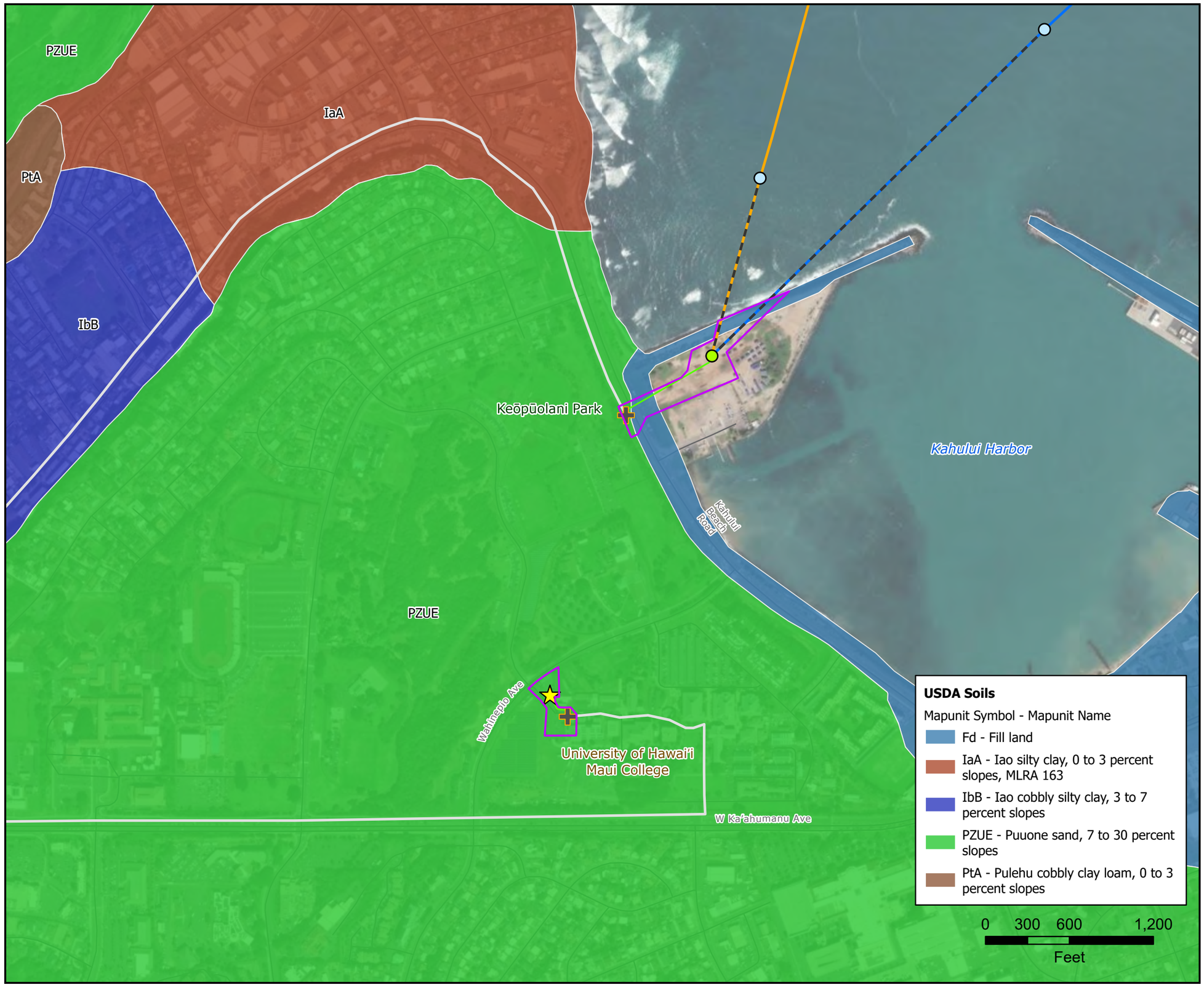
Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\7_USDA_Soils\ONI_HIFL_DraftEA_USDASoils_20251107.aprx

Hawaiian Islands Fiber Link

Figure 6.3
Maui Cable Landing Site: USDA Soils



Project Area

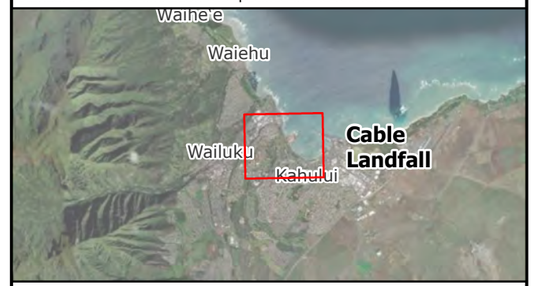
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

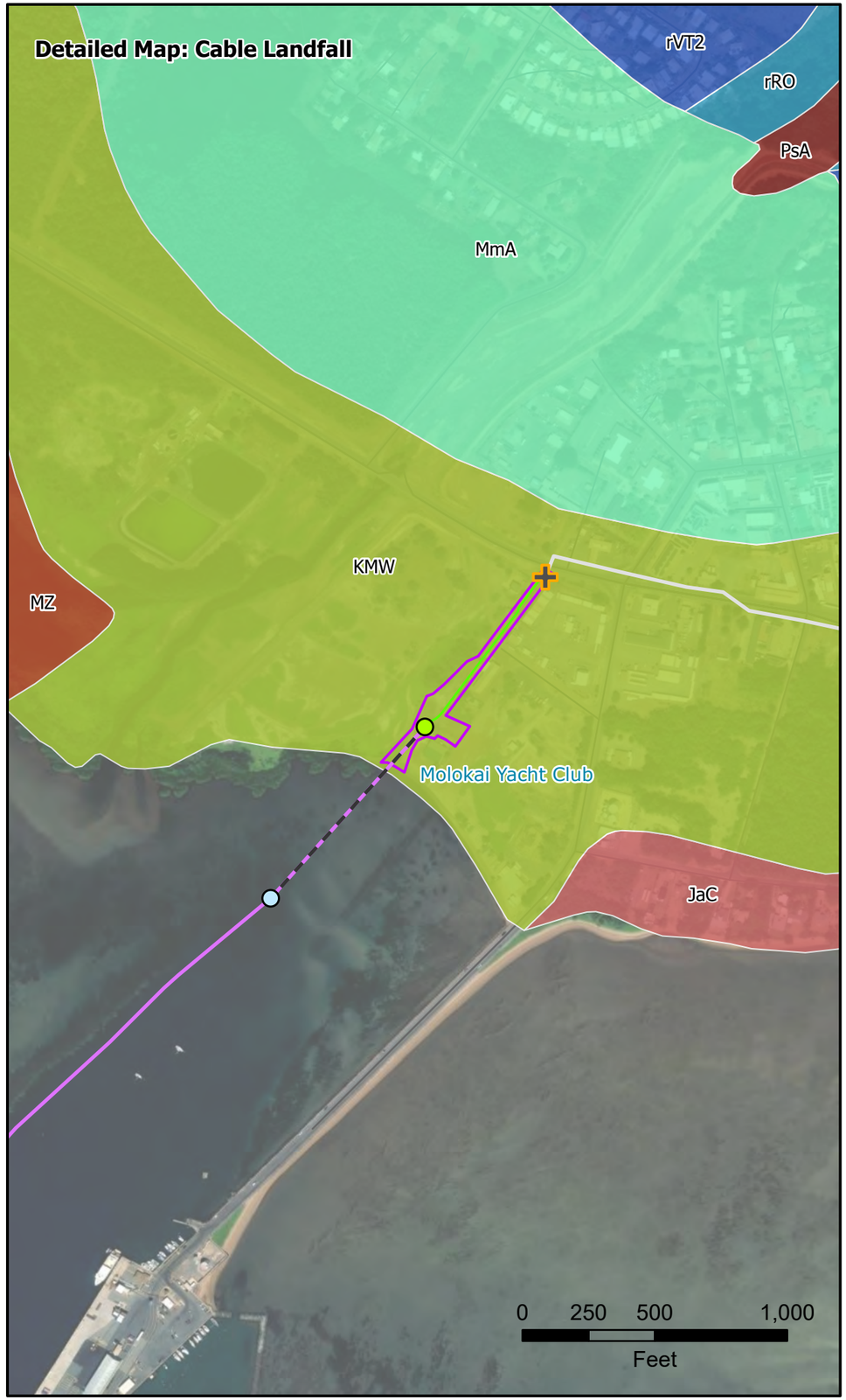
Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\7_USDA_Soils\ONI_HIFL_DraftEA_USDASoils_20251107.aprx





Hawaiian Islands Fiber Link

Figure 6.4

Molokai Cable Landing Site: USDA Soils

- Project Area

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2A)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1 2
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt\local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\7_USDA_Soils\ONI_HIFL_DraftEA_USDASoils_20251107.aprx

Hawaiian Islands Fiber Link

Figure 6.5

Lānaʻi Cable Landing Site: USDA Soils

rVS
rRK
rRK
rVS
Mānele Road
rSL
Mānele Small Boat Harbor
JaC
BS
rVS

USDA Soils

Mapunit Symbol - Mapunit Name

- BS - Beaches
- JaC - Jaucas sand, 0 to 15 percent slopes, MLRA 163
- rRK - Rock land
- rSL - Sandy alluvial land
- rVS - Very stony land

0 250 500 1,000
Feet

- Project Area

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 2B)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

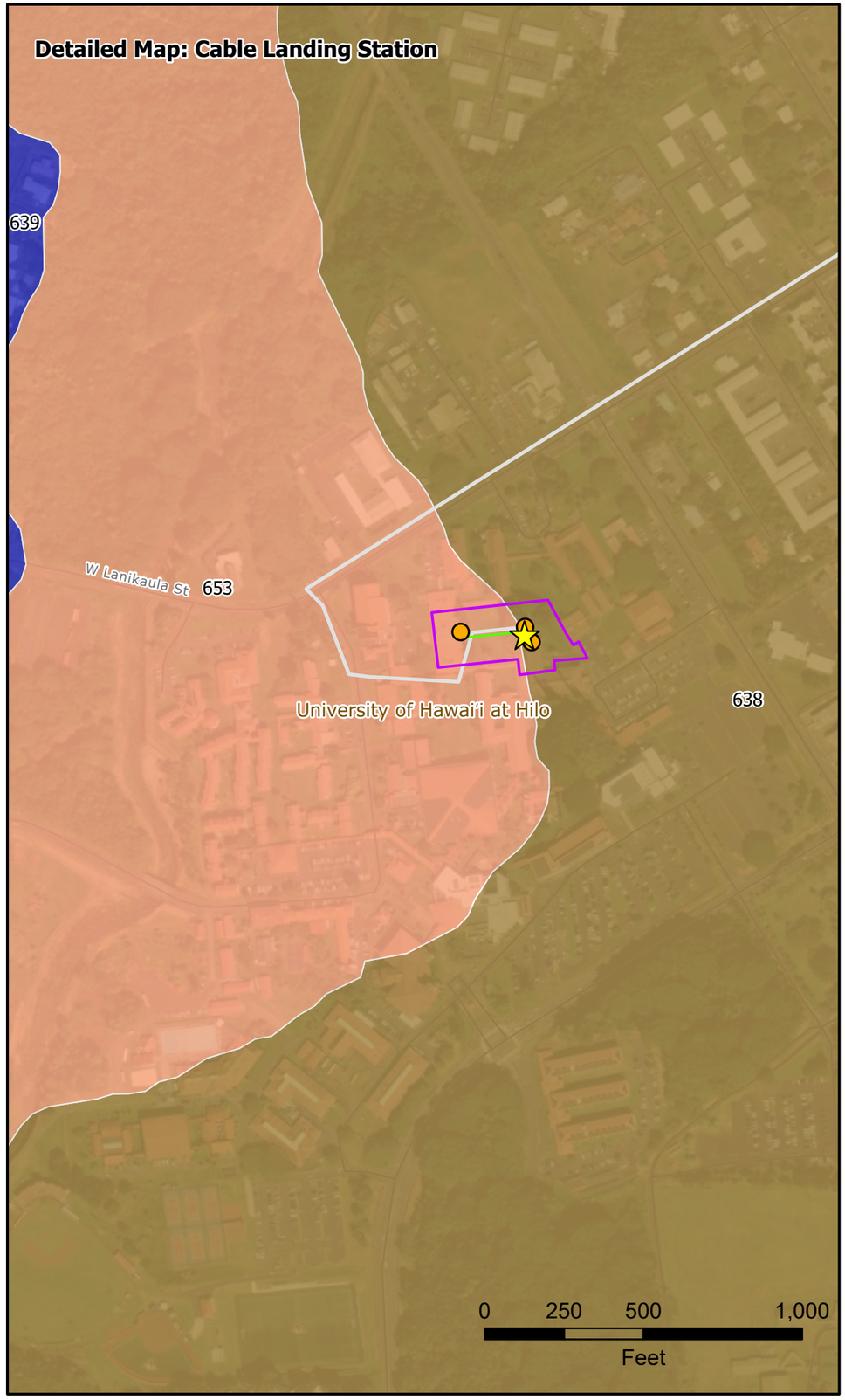
Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA\7_USDA_Soils\ONI_HIFL_DraftEA_USDASoils_20251107.aprx





Hawaiian Islands Fiber Link

Figure 6.6

Hawai'i Island Cable Landing Site: USDA Soils

Project Area

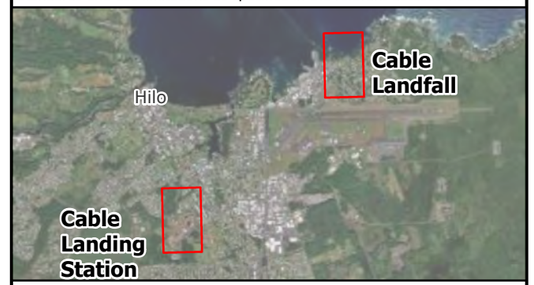
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 3)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1 2 4

Miles

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 12/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

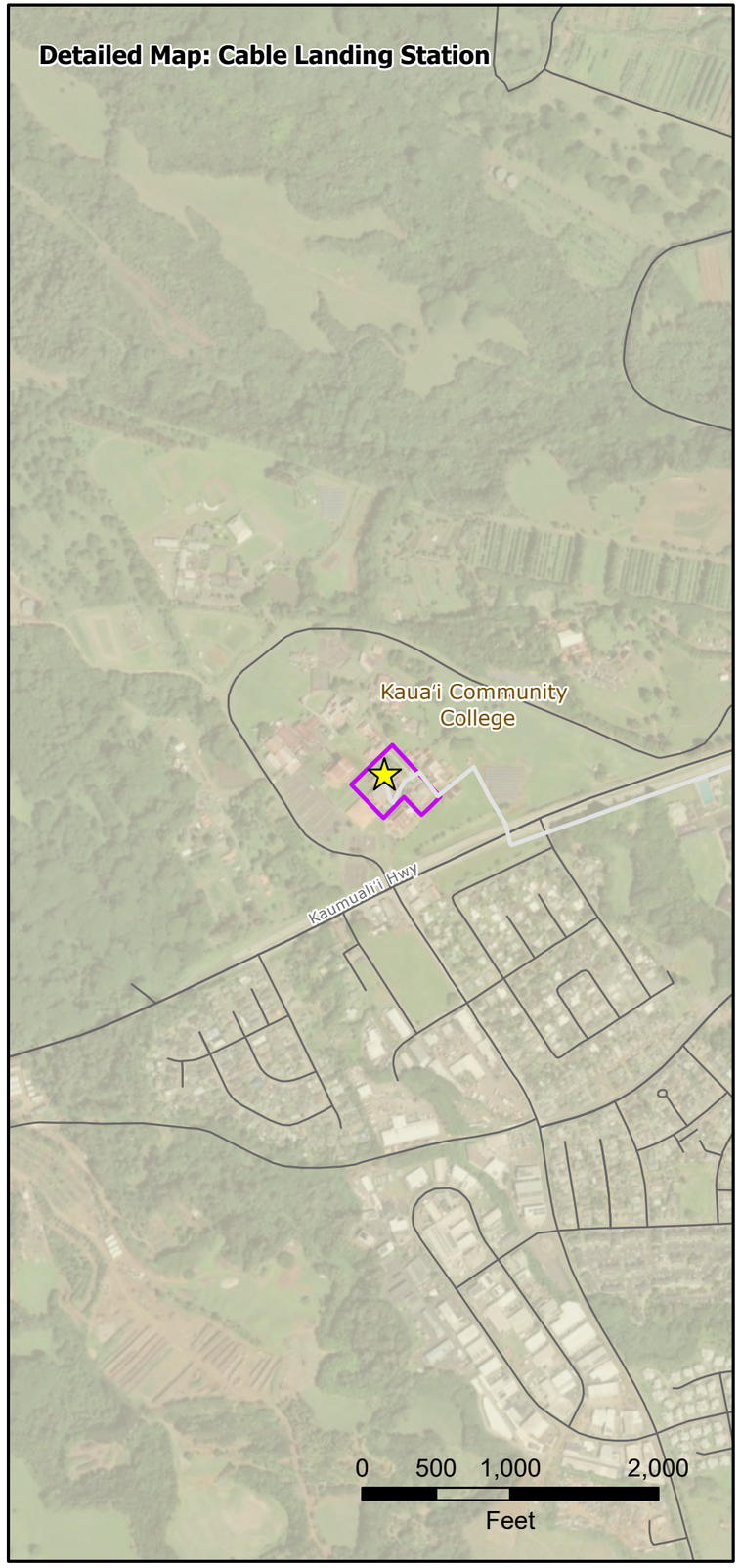
Not for Construction

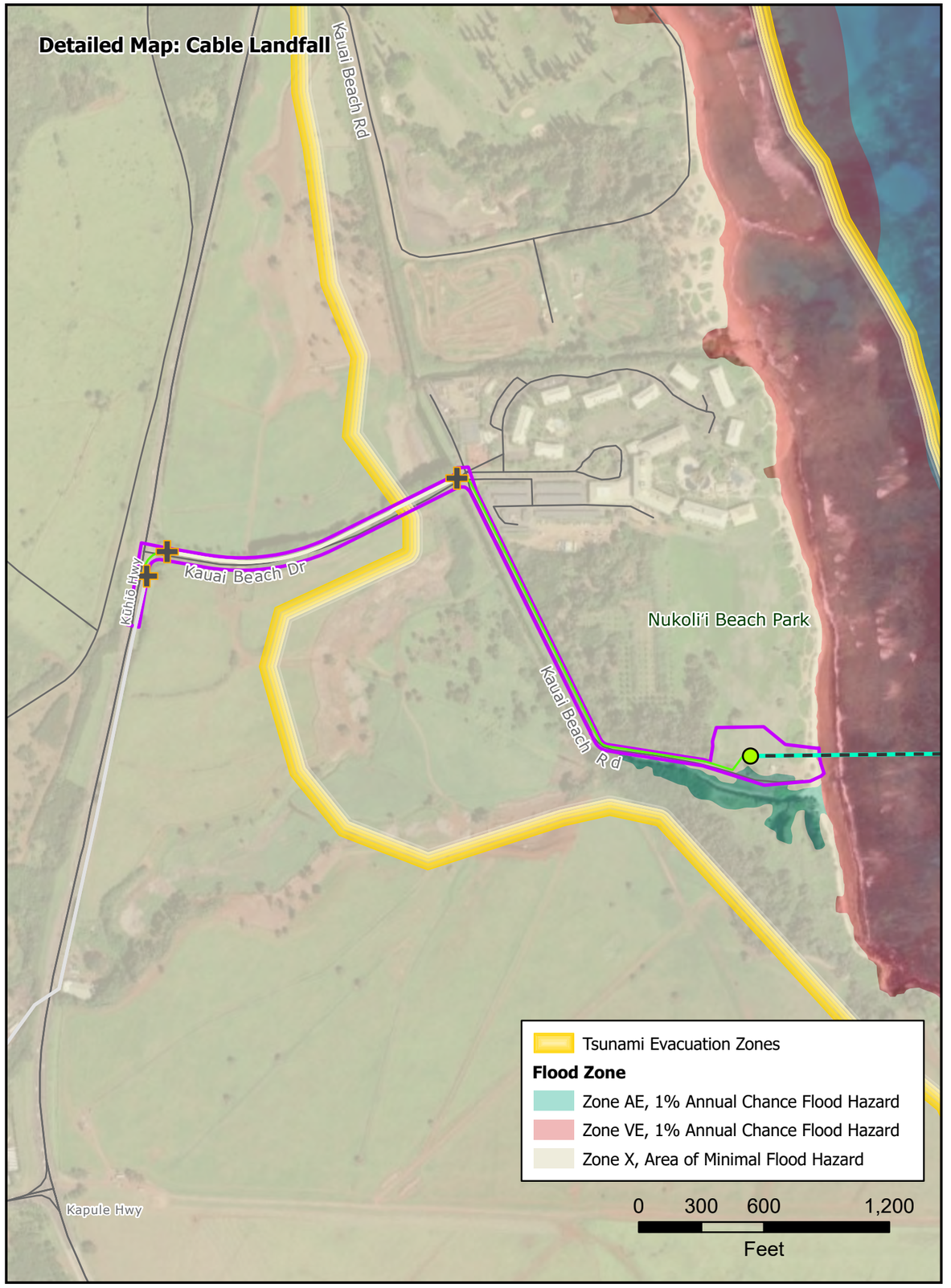
Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\7_USDA_Soils\ONI_HIFL_DraftEA_USDASoils_20251107.aprx

Hawaiian Islands Fiber Link

Figure 7.1

Kaua'i Cable Landing Site: Flood Zones and Tsunami Evacuation Zones





Project Area

Roads

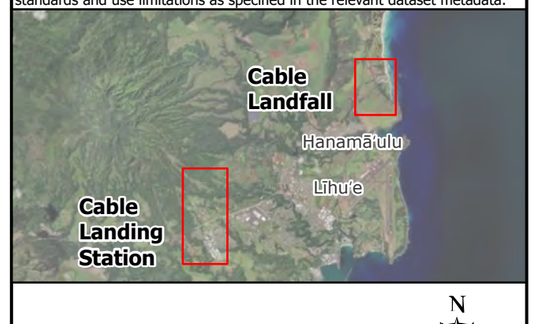
Proposed Project Infrastructure

- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 1)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System
- Third-Party Underground Conduit

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6

Miles

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

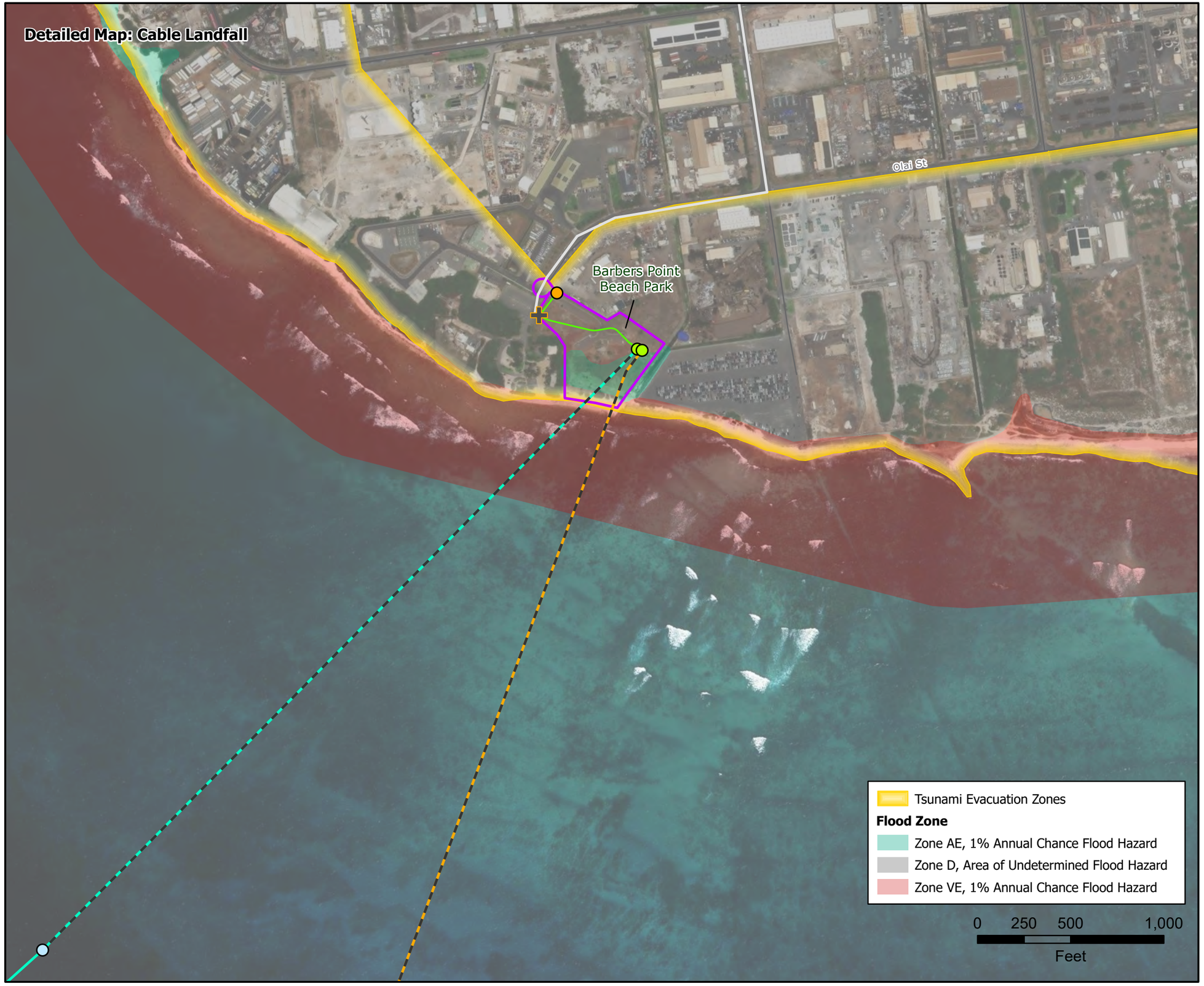
Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\9_Flood_Tsunami_Evacuation\Zones\ONI_HIFL_DraftEA_Flood_Tsunami_EvacuationZones_20251021.aprx



Hawaiian Islands Fiber Link

Figure 7.2

Oʻahu Cable Landing Site: Flood Zones and Tsunami Evacuation Zones

- Project Area
- Roads

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 1)
- Subsea Cable (Segment 2)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\9_Flood_Tsunami_EvacuationZones\ONI_HIFL_DraftEA_Flood_Tsunami_EvacuationZones_20251021.aprx

Hawaiian Islands Fiber Link

Figure 7.3

Maui Cable Landing Site: Flood Zones and Tsunami Evacuation Zones

Keōpūolani Park

Kahului Harbor

Kahului Beach Road

Wahinepio Ave

University of Hawai'i Maui College

W Ka'ahumanu Ave

- Project Area
- Roads

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)
- Fiber Owned by Licensed Utility Company As Part of Existing Utility System
- Tsunami Evacuation Zones

Flood Zone

- Zone AE, 1% Annual Chance Flood Hazard
- Zone VE, 1% Annual Chance Flood Hazard
- Zone X, Area of Minimal Flood Hazard

0 300 600 1,200
Feet

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

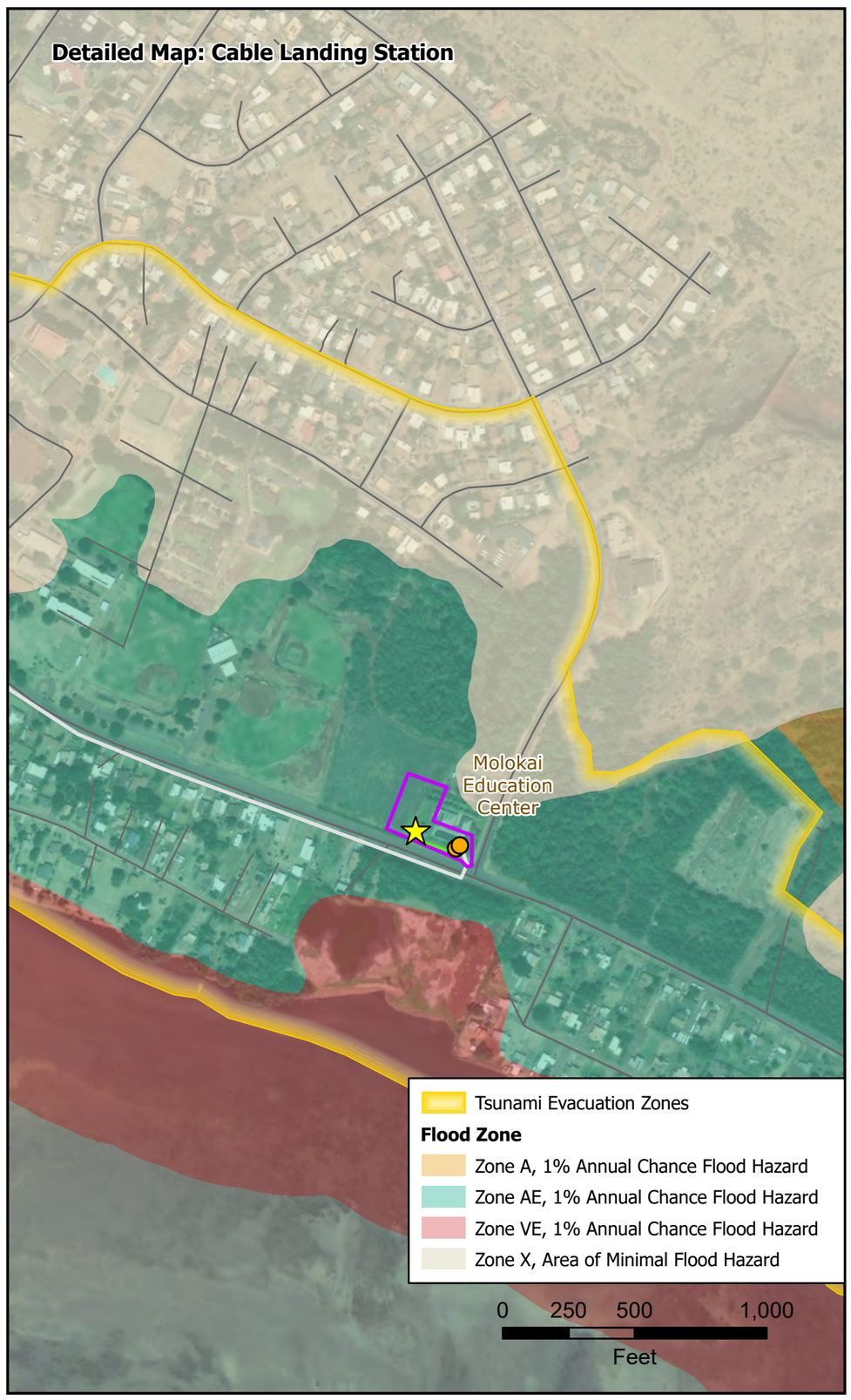
Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\9_Flood_Tsunami_EvacuationZones\ONI_HIFL_DraftEA_Flood_Tsunami_EvacuationZones_20251021.aprx





Hawaiian Islands Fiber Link

Figure 7.4

Molokai Cable Landing Site: Flood Zones and Tsunami Evacuation Zones

- Project Area
- Roads

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2A)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1 2
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

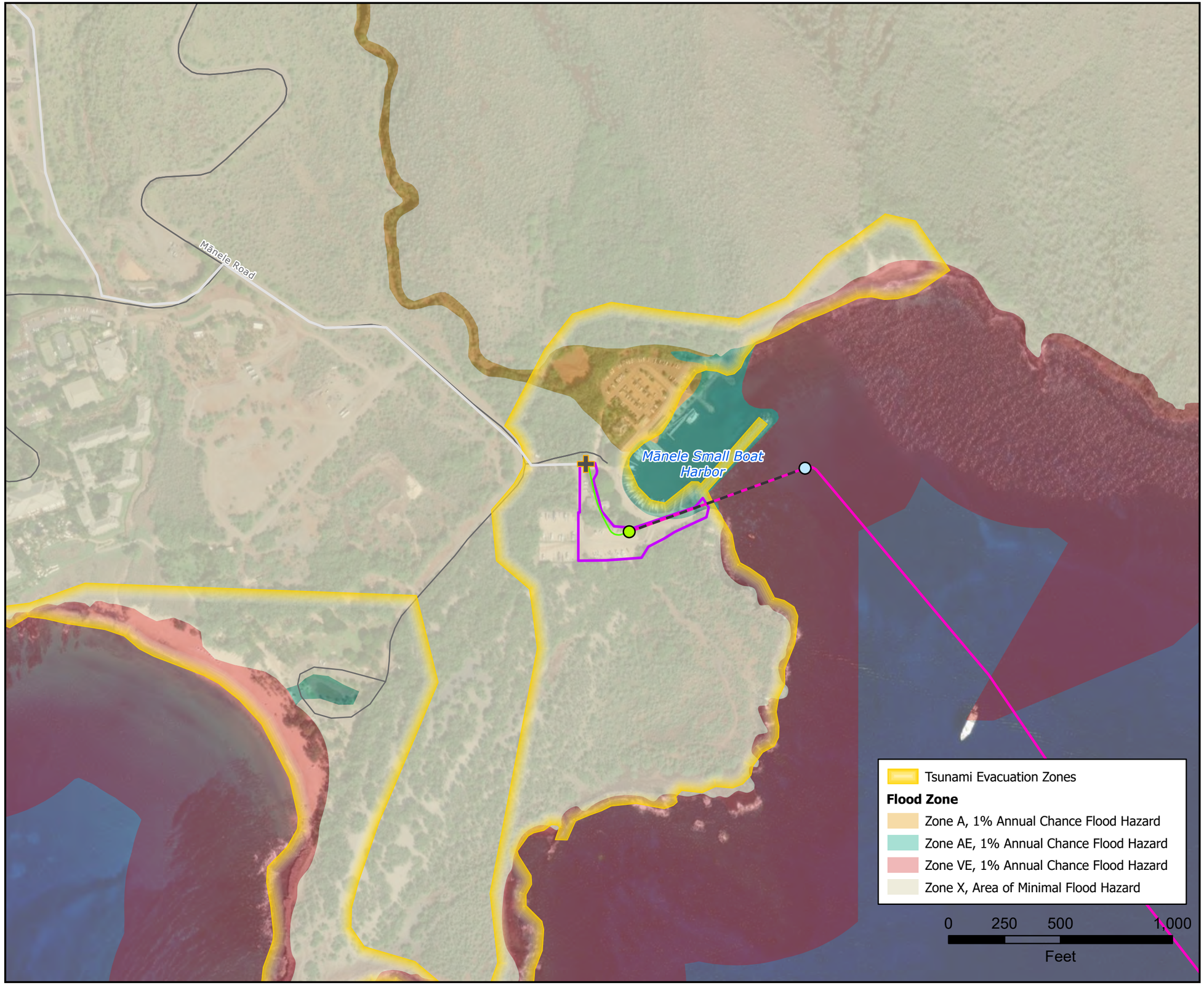
Not for Construction

Document Path: \\tt\local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\8_Flood_Tsunami_EvacuationZones\ONI_HIFL_DraftEA_Flood_Tsunami_EvacuationZones_20251021.aprx

Hawaiian Islands Fiber Link

Figure 7.5

Lānaʻi Cable Landing Site: Flood Zones and Tsunami Evacuation Zones



- Project Area
- Roads

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 2B)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

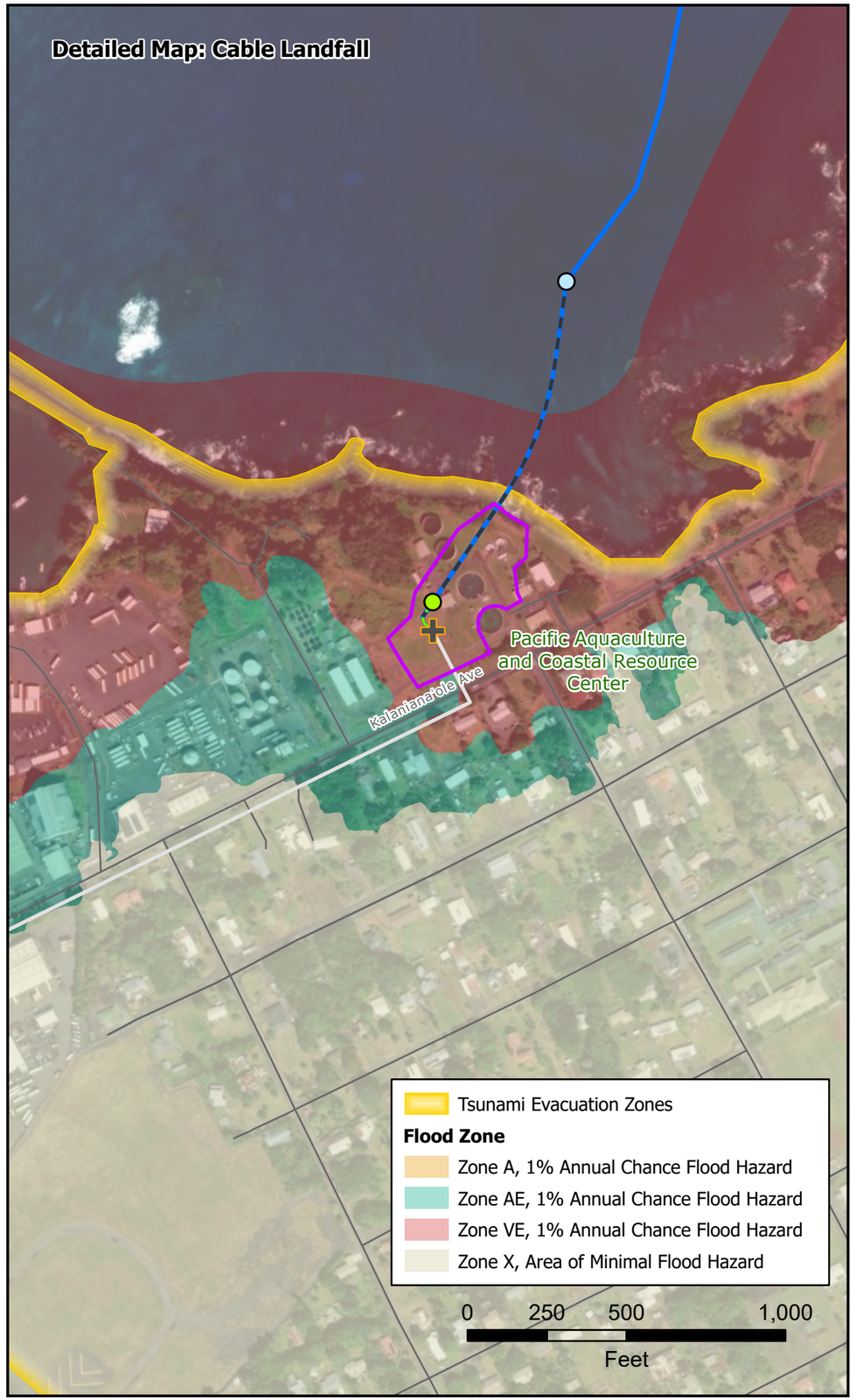
Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\9_Flood_Tsunami_EvacuationZones\ONI_HIFL_DraftEA_Flood_Tsunami_EvacuationZones_20251021.aprx





Hawaiian Islands Fiber Link

Figure 7.6

Hawai'i Island Cable Landing Site: Flood Zones and Tsunami Evacuation Zones

- Project Area
- Roads

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 3)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1 2 4

Miles

N

W E

S

Prepared For: Ocean Networks

Prepared By:	**Date:** 12/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\9_Flood_Tsunami_EvacuationZones\ONI_HIFL_DraftEA_Flood_Tsunami_EvacuationZones_20251114.aprx



Hawaiian Islands Fiber Link

Figure 8.1

Kaua'i Cable Landing Site: Onshore Surface Waters

Project Area

Roads

Division of Aquatic Resources Mapped Features

Stream

Delineated Surface Water Features

Delineated Ditch 1

Delineated Left Bank (Ditch 1/Kawailoa Stream)

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 8 16 32

Miles

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA\10_Onshore_SurfaceWaterFeatures\ONI_HIFL_DraftEA_OnshoreSurfaceWaterFeatures_20251114.aprx



Hawaiian Islands Fiber Link

Figure 8.2
Molokai Cable Landing Site: Onshore Surface Waters

Project Area

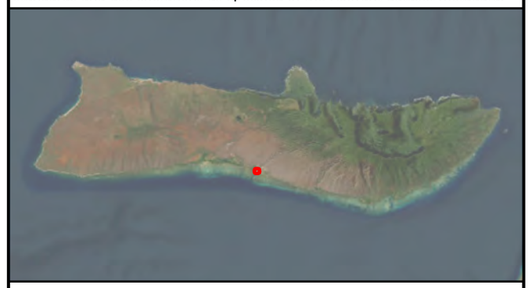
Roads

Delineated Wetland Features

Wetland 1

Wetland 2

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 5 10 20
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\10_Onshore_SurfaceWaterFeatures\ONI_HIFL_DraftEA_OnshoreSurfaceWaterFeatures_20251114.aprx

Hawaiian Islands Fiber Link

Figure 9.1

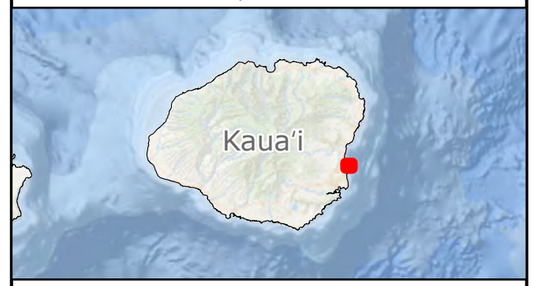
Kaua'i Cable Landing Site: Benthic Habitat Impacts

Potential Impact Corridor
End of Split Pipe
Punchout Point
Subsea Cable (Segment 1)
Horizontal Directional Drilling
5-foot Bathymetric Contours

Coastal and Marine Ecological Classification Standard Substrate Component

Coral Reef Rubble
Coral Reef Rubble, Steeply Sloping
Coral Reef Substrate
Sandy Substrate
Steeply Sloping

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1 0.2
Miles

0 250 500
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 01/2026

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

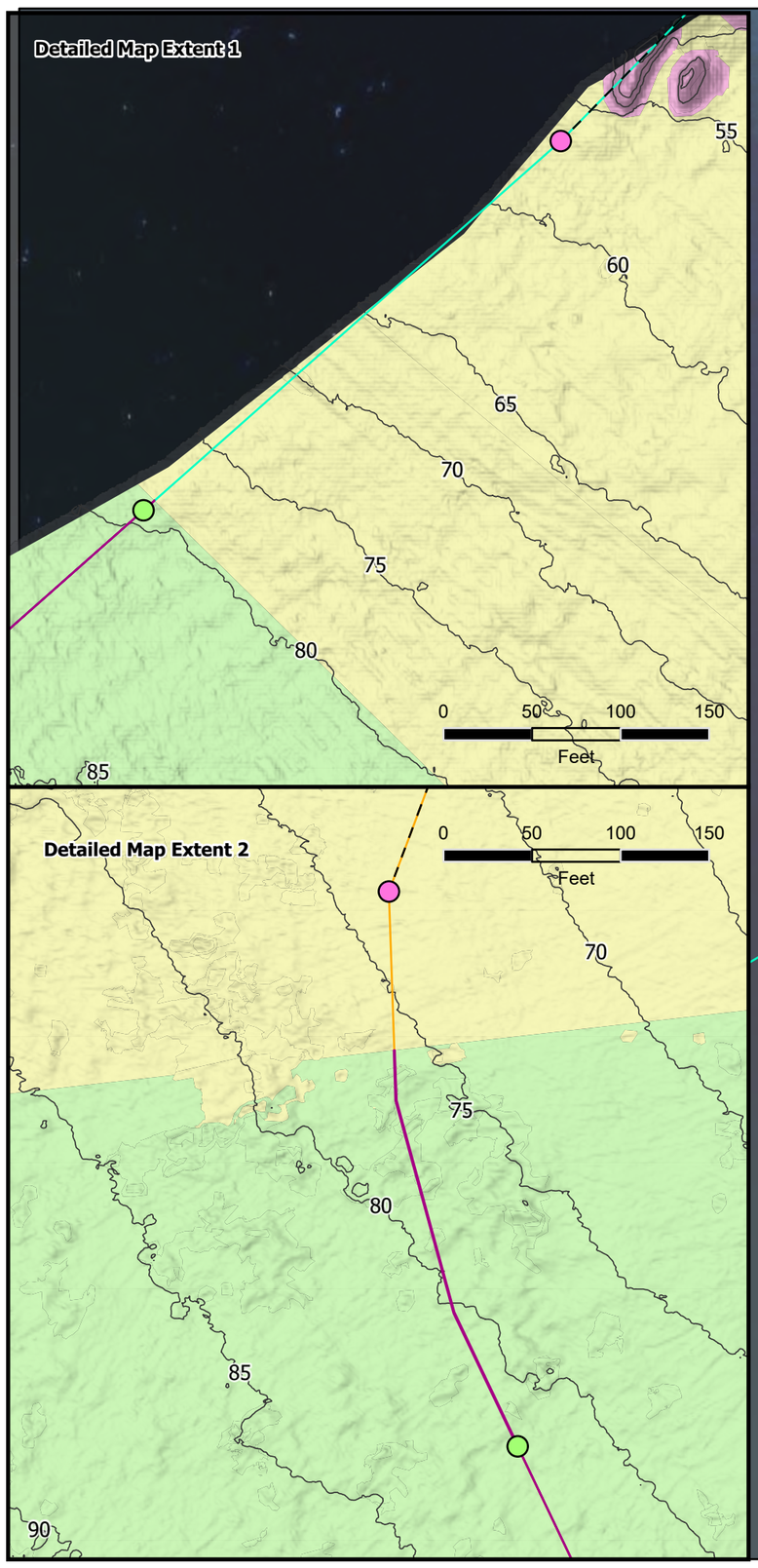
Not for Construction

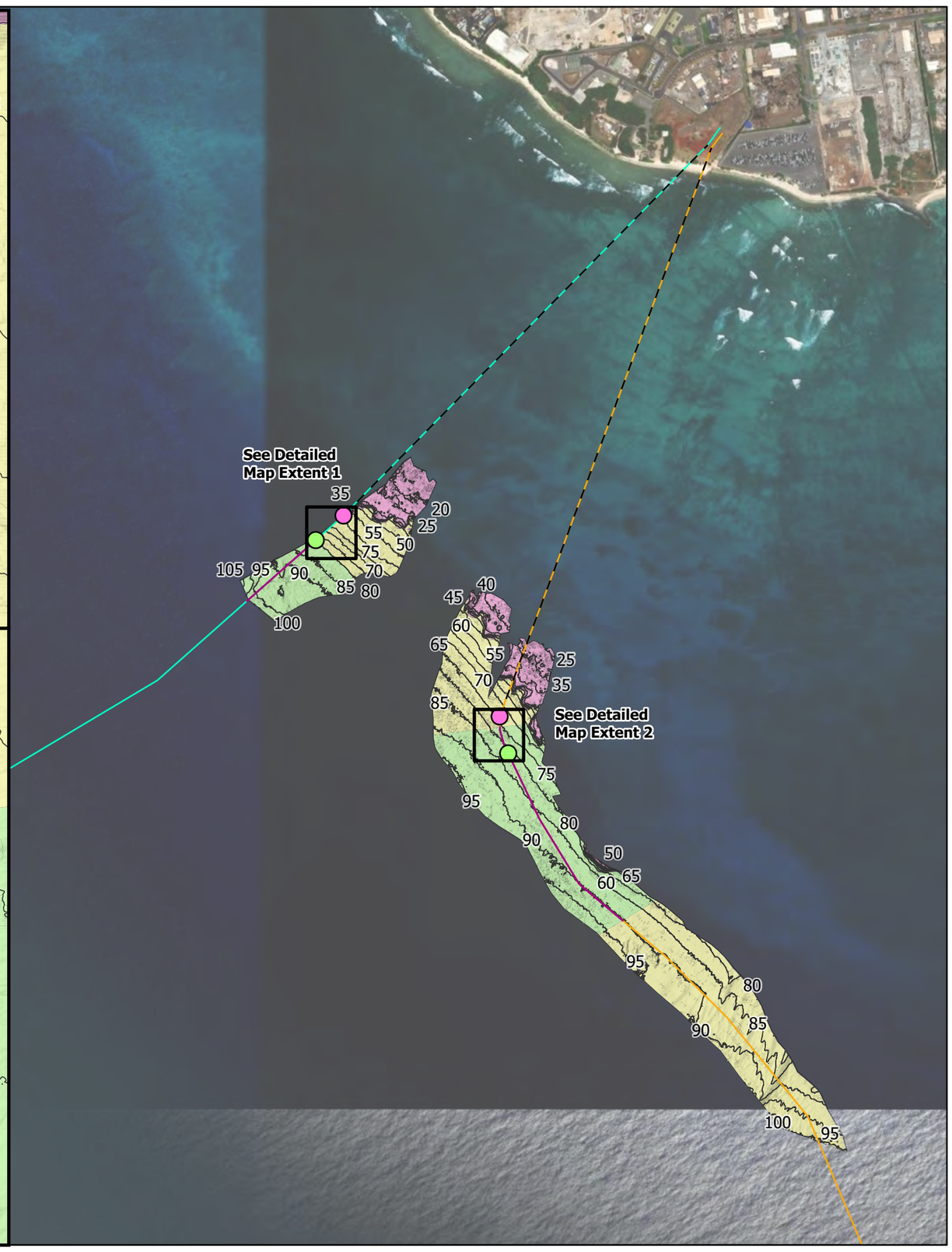
Document Path: \\tt-local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\8_BenthicHabitat_Overviews\ONI_HIFL_DraftEA_BenthicHabitat_Overviews_20260116.aprx

Hawaiian Islands Fiber Link

Figure 9.2

O'ahu Cable Landing Site: Benthic Habitat Impacts



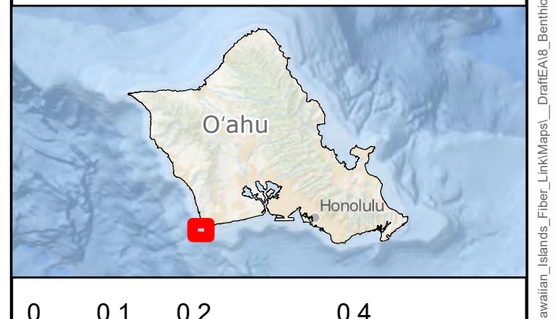


Potential Impact Corridor
End of Split Pipe
Punchout Point
Subsea Cable (Segment 1)
Subsea Cable (Segment 2)
Horizontal Directional Drilling
5-foot Bathymetric Contours

Coastal and Marine Ecological Classification Standard Substrate Component

Coral Reef Substrate
Sandy Substrate
Sandy Substrate, Seagrass Bed

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2 0.4
Miles

0 500 1,000
Feet

N
W
E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 01/2026

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_Draft\EA\8_BenthicHabitat_Overviews\ONI_HIFL_DraftEA_BenthicHabitat_Overviews_20260116.aprx

Hawaiian Islands Fiber Link

Figure 9.3

Maui Cable Landing Site: Benthic Habitat Impacts

- End of Split Pipe
- Punchout Point
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Horizontal Directional Drilling
- 2-foot Bathymetric Contours

Coastal and Marine Ecological Classification Standard Substrate Component

- Sandy Substrate
- Coral Reef Substrate

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2 0.3

Miles

0 500 1,000

Feet

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 01/2026

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

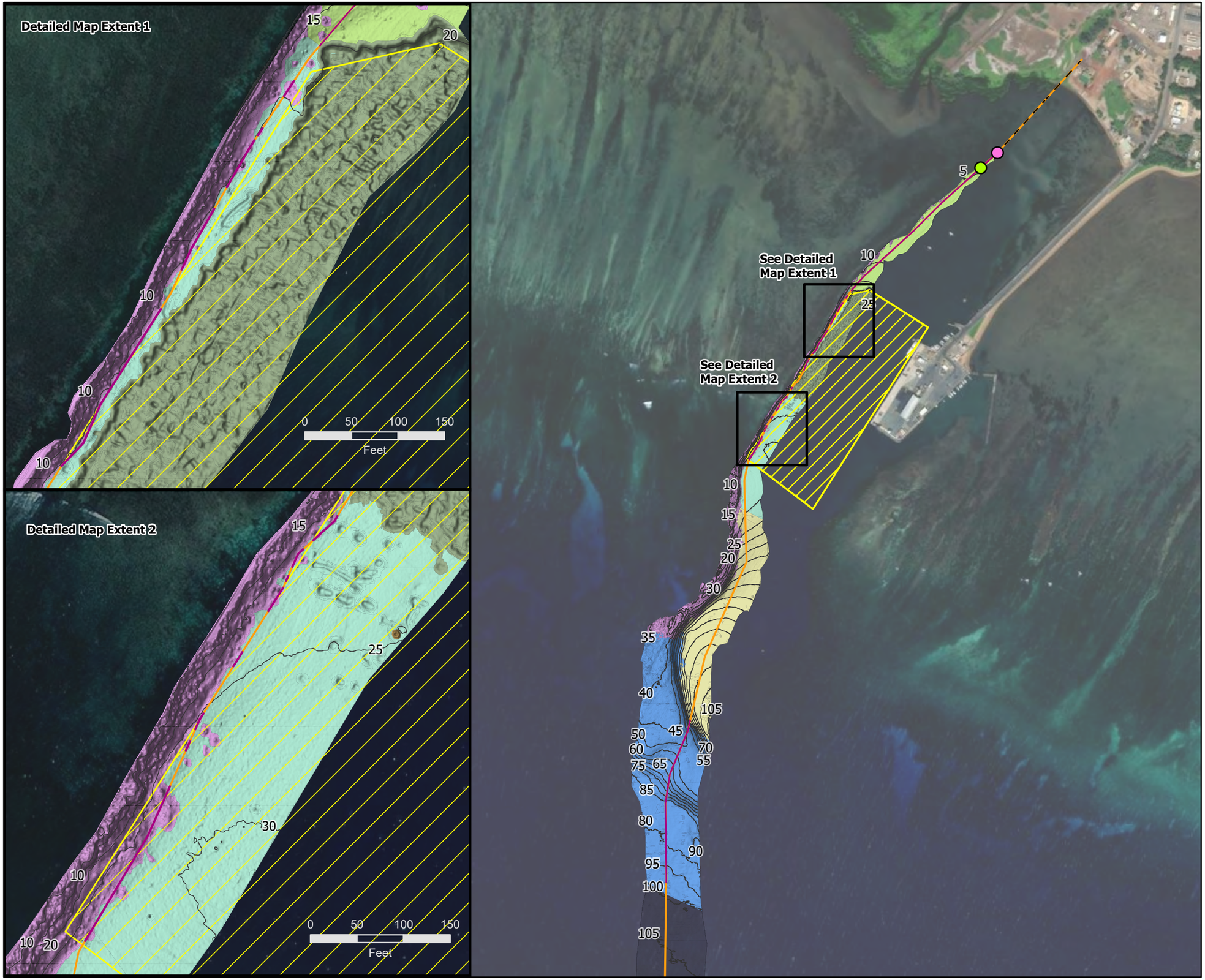
Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\8_BenthicHabitat_Overviews\ONI_HIFL_DraftEA_BenthicHabitat_Overviews_20260116.aprx

Hawaiian Islands Fiber Link

Figure 9.4

Molokai Cable Landing Site: Benthic Habitat Impacts



- Potential Impact Corridor
- End of Split Pipe
- Punchout Point
- Subsea Cable (Segment 2A)
- Horizontal Directional Drilling
- 5-foot Bathymetric Contours
- USACE Section 408 Harbor Basin Boundary

Coastal and Marine Ecological Classification Standard Substrate Component

- Coarse Unconsolidated Aggregate Substrate
- Coral Reef Rubble
- Coral Reef Substrate
- Muddy Substrate
- Muddy Substrate, Dredged
- Muddy Substrate, Seagrass Bed
- Sandy Substrate

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1 0.2
Miles

0 400 800
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 01/2026

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt-local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\8_BenthicHabitat_Overviews\ONI_HIFL_DraftEA_BenthicHabitat_Overviews_20260116.aprx

Hawaiian Islands Fiber Link

Figure 9.5

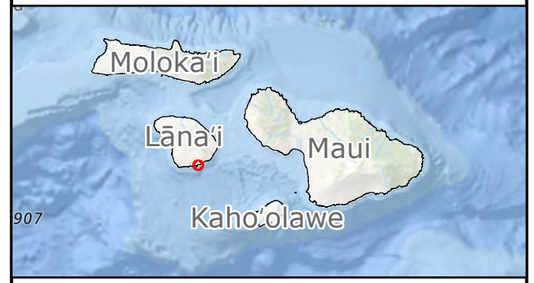
Lānaʻi Cable Landing Site: Benthic Habitat Impacts

- End of Split Pipe
- Punchout Point
- Subsea Cable (Segment 2B)
- Horizontal Directional Drilling
- 2-foot Bathymetric Contours

Coastal and Marine Ecological Classification Standard Substrate Component

- Fixed Metal Substrate
- Sandy Substrate
- Coral Reef Substrate

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.02 0.04 0.06
Miles

0 100 200
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 01/2026

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

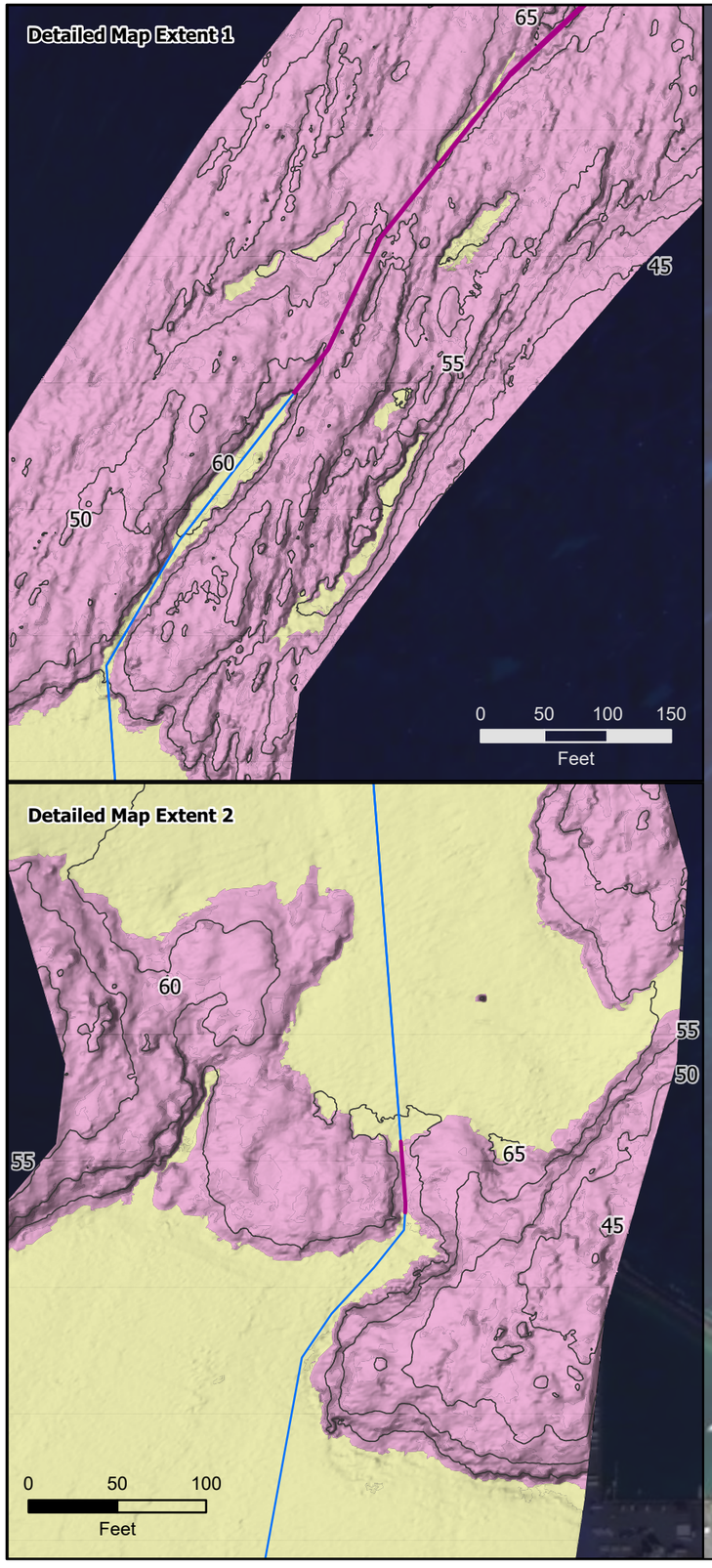
Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\8_BenthicHabitat_Overviews\ONI_HIFL_DraftEA_BenthicHabitat_Overviews_20260116.aprx

Hawaiian Islands Fiber Link

Figure 9.6

Hawai'i Island Cable Landing Site: Benthic Habitat Impacts





- Potential Impact Corridor
- Punchout Point
- End of Split Pipe
- Subsea Cable (Segment 3)
- Horizontal Directional Drilling
- 5-foot Bathymetric Contours

Coastal and Marine Ecological Classification Standard Substrate Component

- Sandy Substrate
- Coral Reef Substrate

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2 0.3
Miles

0 500 1,000
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 01/2026

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\tt-local\GIS\US\CES\Projects\PDX\OceanNetworksIncHawaiian_Islands_Fiber_Link\Maps_DraftEA\8_BenthicHabitat_Overviews\ONI_HIFL_DraftEA_BenthicHabitat_Overviews_20260116.aprx



Hawaiian Islands Fiber Link

Figure 10

Designated Critical Habitat for Marine Species

- Cable Landing Site
- State Waters Limits (3 nautical miles)

Subsea Cable

- Segment 1
- Segment 2
- Segment 2A
- Segment 2B
- Segment 3

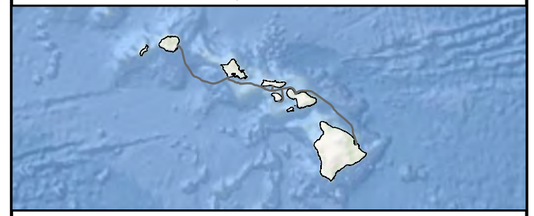
Monk Seal (Neomonachus schauinslandi) Critical Habitat

- Marine
- Terrestrial (extends from water's edge inland 16 feet [5 m] past shoreline)

False killer whale (Pseudorca crassidens), MHI insular DPS

- Marine

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 40 80 120
Kilometers

0 20 40 60
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, NOAA, Esri, et. al.

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Not for Construction

Document Path: \\tt-local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\13_CriticalHabitat_Overview\ON_HIFL_DraftEA_Critical_Habitat_Overview_20251117.aprx



Hawaiian Islands Fiber Link

Figure 11
Proposed Critical Habitat for Marine Species

Cable Landing Site

State Waters Limits (3 nautical miles)

Subsea Cable

Segment 1

Segment 2

Segment 2A

Segment 2B

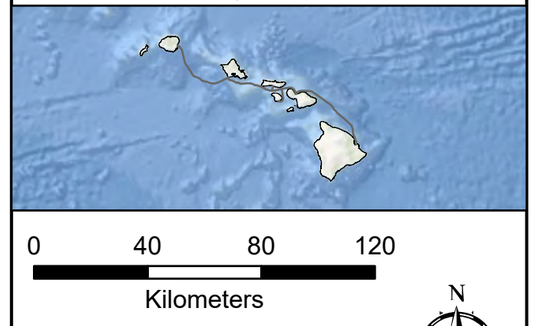
Segment 3

Proposed Green Sea Turtle (Chelonia mydas) Critical Habitat

Marine

Terrestrial

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 40 80 120

Kilometers

0 20 40 60

Miles

N

W E

S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

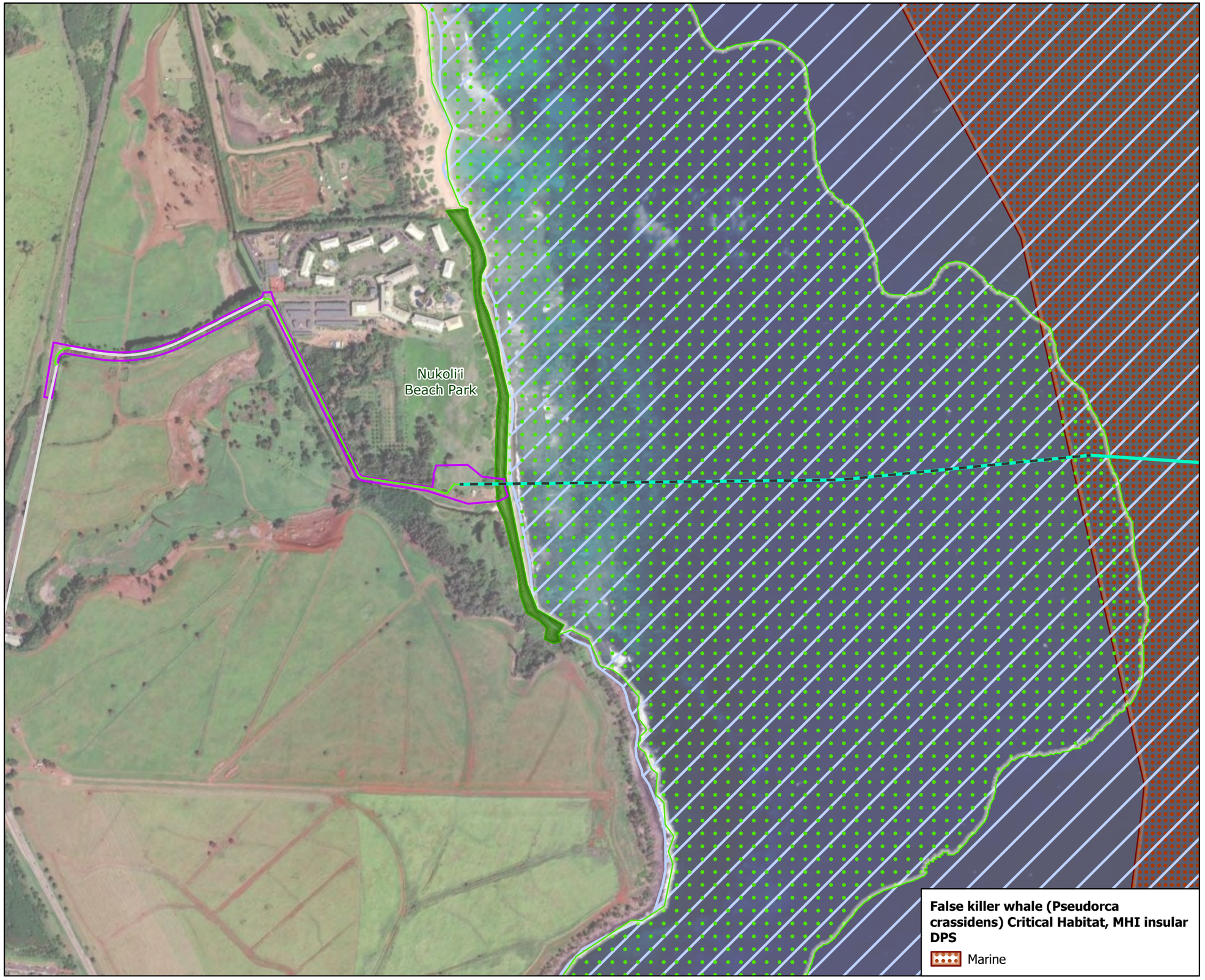
Date: 11/2025

Source: HI Statewide GIS, USFWS, USGS, NOAA, Esri

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\13_CriticalHabitat_Overview\ONI_HIFL_DraftEA_Critical_Habitat_Overview_20251117.aprx



Hawaiian Islands Fiber Link

Figure 12.1

Kaua'i Cable Landing Site: Critical Habitat

Project Area

Proposed Project Infrastructure

Borehole

Subsea Cable (Segment 1)

Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Proposed Green Sea Turtle (Chelonia mydas) Critical Habitat

Marine

Terrestrial

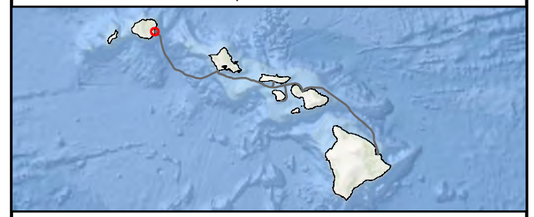
Monk Seal (Neomonachus schauinslandi) Critical Habitat

Marine

False killer whale (Pseudorca crassidens) Critical Habitat, MHI insular DPS

Marine

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2 0.3

Miles

0 500 1,000

Feet

N W E S

Prepared For: OCEAN Networks

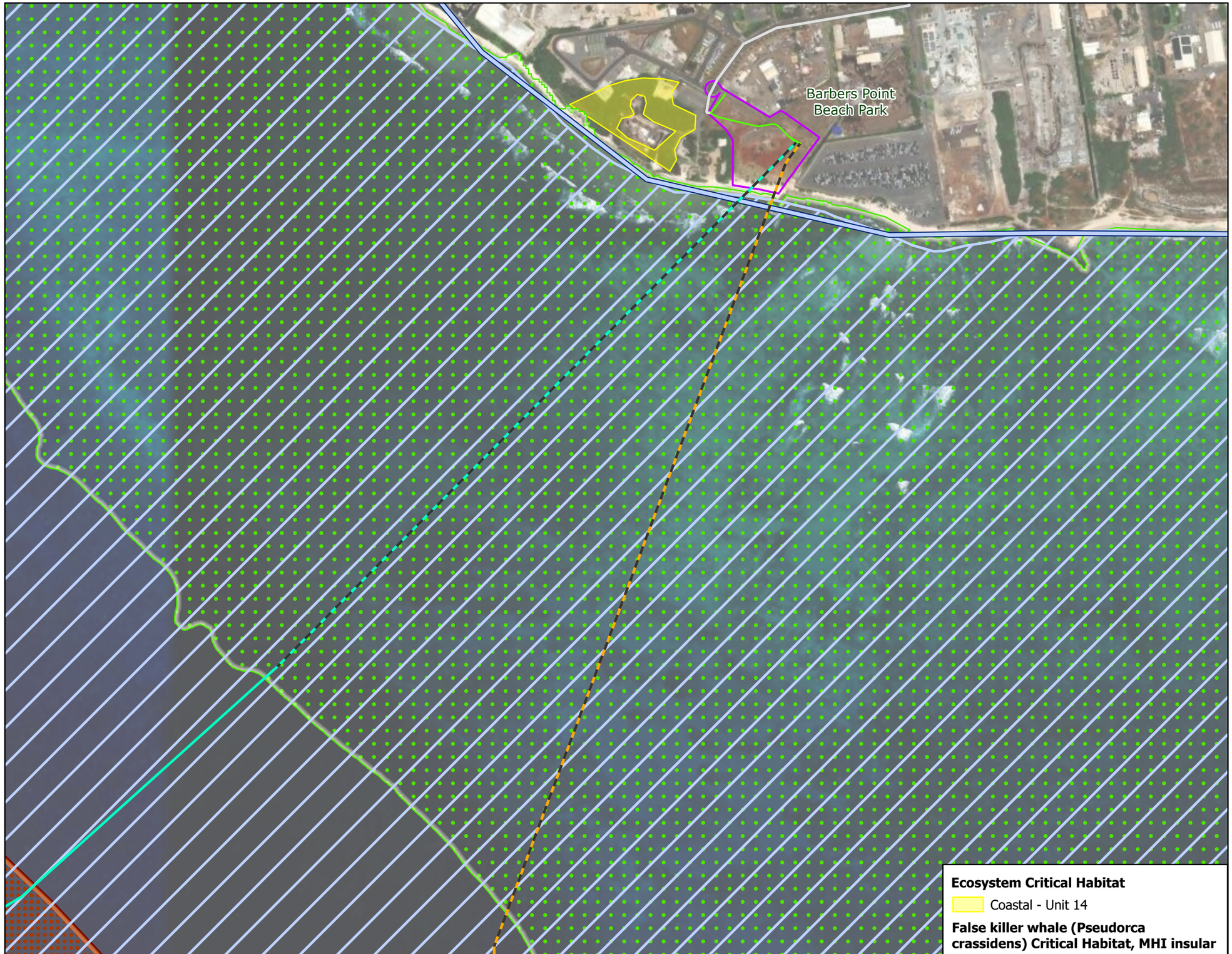
Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, NOAA, USFWS, USGS, Esri, et. al.,
Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA14_CriticalHabitat_CableLandingSites\ONI_HIFL_DraftEA_Critical_Habitat_CableLandingSites_20251117.aprx



Hawaiian Islands Fiber Link

Figure 12.2

O'ahu Cable Landing Site: Critical Habitat

Project Area

Proposed Project Infrastructure

Borehole

Subsea Cable (Segment 1)

Subsea Cable (Segment 2)

Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Proposed Green Sea Turtle (Chelonia mydas) Critical Habitat

Marine

Monk Seal (Neomonachus schauinslandi) Critical Habitat

Marine

Terrestrial (extends from water's edge inland 16 feet [5 m] past shoreline)

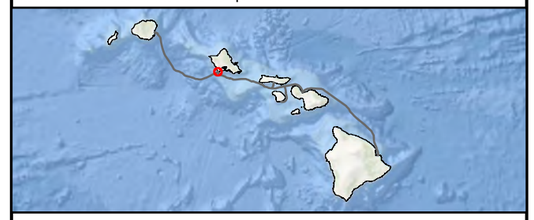
Ecosystem Critical Habitat

Coastal - Unit 14

False killer whale (Pseudorca crassidens) Critical Habitat, MHI insular DPS

Marine

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2 0.3

Miles

0 500 1,000

Feet

N W E S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, NOAA, USFWS, USGS, Esri, et. al.,
Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworks\Incl\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\14_CriticalHabitat_CableLandingSites\ONI_HIFL_DraftEA_Critical_Habitat_CableLandingSites_20251117.aprx

Hawaiian Islands Fiber Link

Figure 12.3

Maui Cable Landing Site: Critical Habitat

Project Area

Proposed Project Infrastructure

Borehole

Subsea Cable (Segment 2)

Subsea Cable (Segment 3)

Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Proposed Green Sea Turtle (Chelonia mydas) Critical Habitat

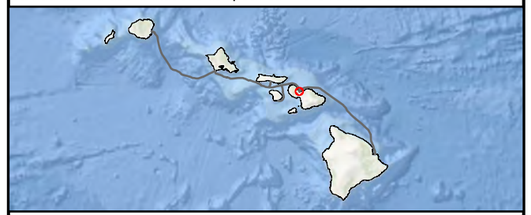
Marine

Monk Seal (Neomonachus schauinslandi) Critical Habitat

Marine

Terrestrial (extends from water's edge inland 16 feet [5 m] past shoreline)

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2

Miles

0 250 500 750

Feet

N

W E

S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, NOAA, USFWS, USGS, Esri, et. al.,
Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt-local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\14_CriticalHabitat_CableLandingSites\ONI_HIFL_DraftEA_Critical_Habitat_CableLandingSites_20251117.aprx

Hawaiian Islands Fiber Link

Figure 12.4

Molokai Cable Landing Site: Critical Habitat

Kaunakaka

Kaunakakai Harbor

Project Area

Proposed Project Infrastructure

Borehole

Subsea Cable (Segment 2A)

Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

Fiber Owned by Licensed Utility Company As Part of Existing Utility System

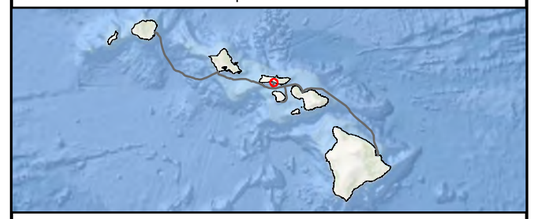
Proposed Green Sea Turtle (Chelonia mydas) Critical Habitat

Marine

Monk Seal (Neomonachus schauinslandi) Critical Habitat

Marine

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2

Miles

0 250 500 750

Feet

N

W E

S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

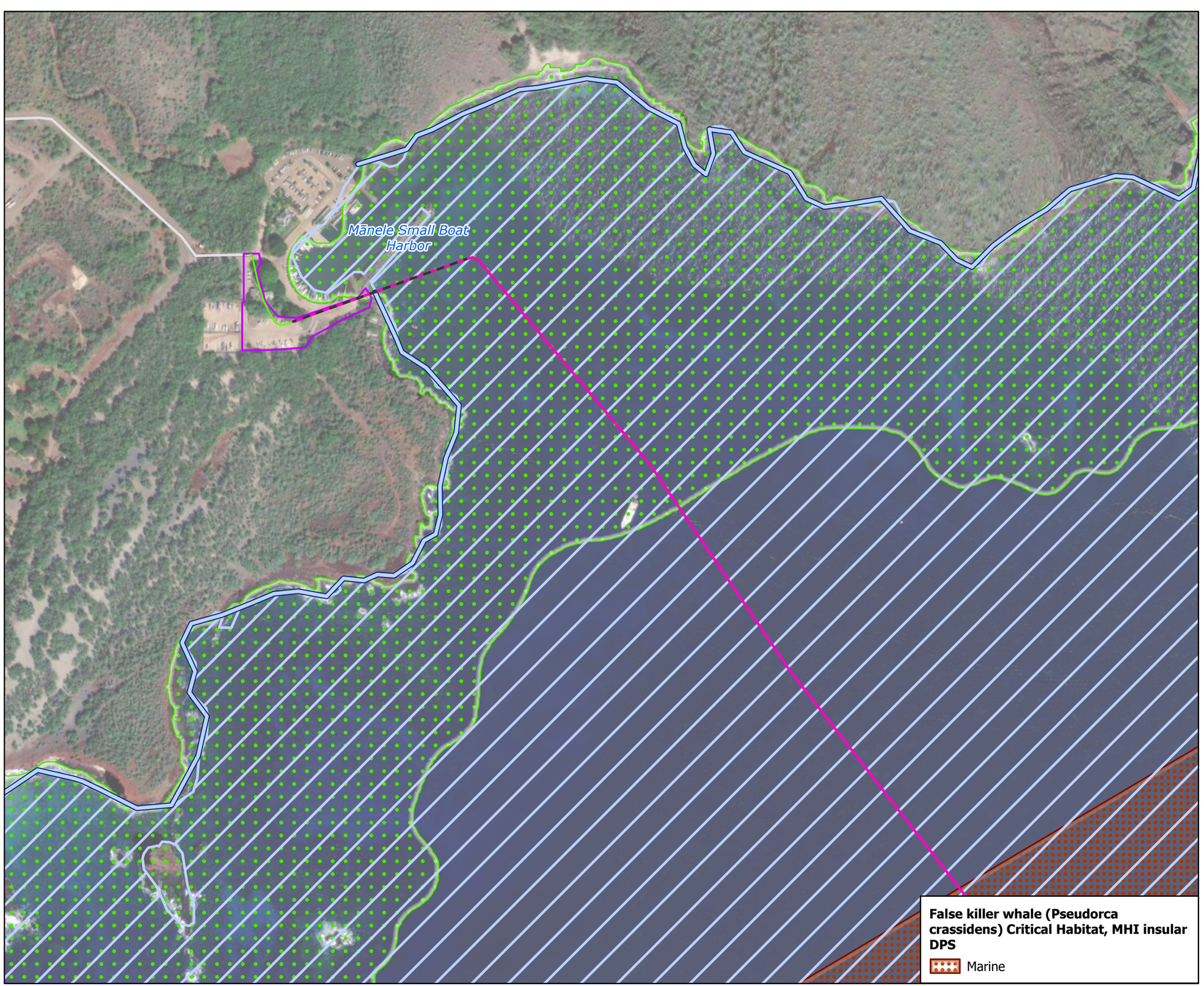
Date: 11/2025

Source: Hawaii Statewide GIS, NOAA, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA\14_CriticalHabitat_CableLandingSites\ONI_HIFL_DraftEA_Critical_Habitat_CableLandingSites_20251117.aprx



Hawaiian Islands Fiber Link

Figure 12.5

Lānaʻi Cable Landing Site: Critical Habitat

Project Area

Proposed Project Infrastructure

Borehole

Subsea Cable (Segment 2B)

Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Proposed Green Sea Turtle (Chelonia mydas) Critical Habitat

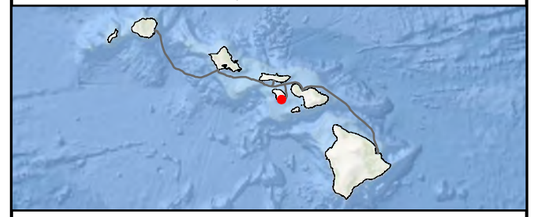
Marine

Monk Seal (Neomonachus schauinslandi) Critical Habitat

Marine

Terrestrial (extends from water's edge inland 16 feet [5 m] past shoreline)

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2

Miles

0 250 500 750

Feet

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, NOAA, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\14_CriticalHabitat_CableLandingSites\ONI_HIFL_DraftEA_Critical_Habitat_CableLandingSites_20251117.aprx

Hawaiian Islands Fiber Link

Figure 12.6
Hawaii Island Cable Landing Site: Critical Habitat

Project Area

Proposed Project Infrastructure

Borehole

Terrestrial Cable (Underground Conduit)

Subsea Cable (Segment 3)

Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Proposed Green Sea Turtle (Chelonia mydas) Critical Habitat

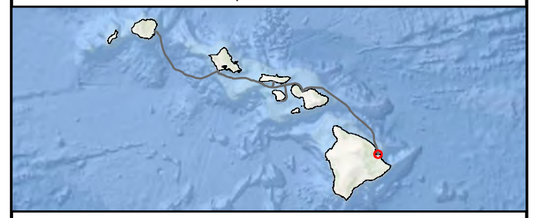
Marine

Monk Seal (Neomonachus schauinslandi) Critical Habitat

Marine

Terrestrial (extends from water's edge inland 16 feet [5 m] past shoreline)

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2
Miles

0 250 500 750 1,000
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 12/2025

Source: Hawaii Statewide GIS, NOAA, USFWS, USGS, Esri, et. al.,
Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\14_CriticalHabitat_CableLandingSites\ONI_HIFL_DraftEA_Critical_Habitat_CableLandingSites_20251117.aprx



Hawaiian Islands Fiber Link

Figure 13
Hawaiian Islands Humpback Whale National Marine Sanctuary

- Cable Landing Site
- State Waters Limits (3 nautical miles)

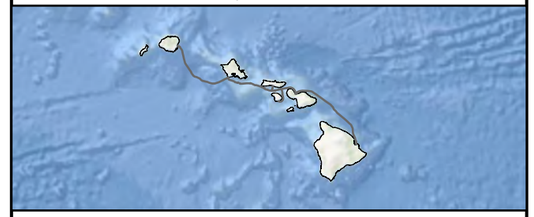
Subsea Cable

- Segment 1
- Segment 2
- Segment 2A
- Segment 2B
- Segment 3

National Marine Sanctuary

- Hawaiian Islands Humpback Whale National Marine Sanctuary

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 40 80 120
Kilometers

0 20 40 60
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, NOAA, Esri, et. al.

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\13_CriticalHabitat_Overview\ON_HIFL_DraftEA_Critical_Habitat_Overview_20251117.aprx

Hawaiian Islands Fiber Link

Figure 14.1

Kaua'i Cable Landing Site: Historic Properties



- Project Area

Proposed Project Infrastructure

- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 1)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Previously Identified and Potential Historic Properties

- Potential Historic Property
- Historic Property
- Historic Property
- Reinterment Site

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2 0.3

Kilometers

0 500

Feet

N W E S

Prepared For: OOI Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA15_HistoricProperties\ONI_HIFL_DraftEA_HistoricProperties_20251124.aprx

Hawaiian Islands Fiber Link

Figure 14.2
Maui Cable Landing Site: Historic Properties



Project Area

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Previously Identified Historic Properties

- Historic Property

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.3 0.4
Kilometers

0 500 1,000
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\15_HistoricProperties\ONI_HIFL_DraftEA_HistoricProperties_20251107.aprx



Hawaiian Islands Fiber Link

Figure 14.3
Molokai Cable Landing Site: Historic Properties

Project Area

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 2A)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Previously Identified and Potential Historic Properties

- Potential Historic Property
- Historic Property
- Historic Property

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1
Kilometers

0 100 200 300
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA15_HistoricProperties\ONI_HIFL_DraftEA_HistoricProperties_20251107.aprx



Hawaiian Islands Fiber Link

Figure 14.4

Lānaʻi Cable Landing Site: Historic Properties

- Project Area

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 2B)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Potential Historic Properties

- Potential Historic Properties

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1
Kilometers

0 100 200
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

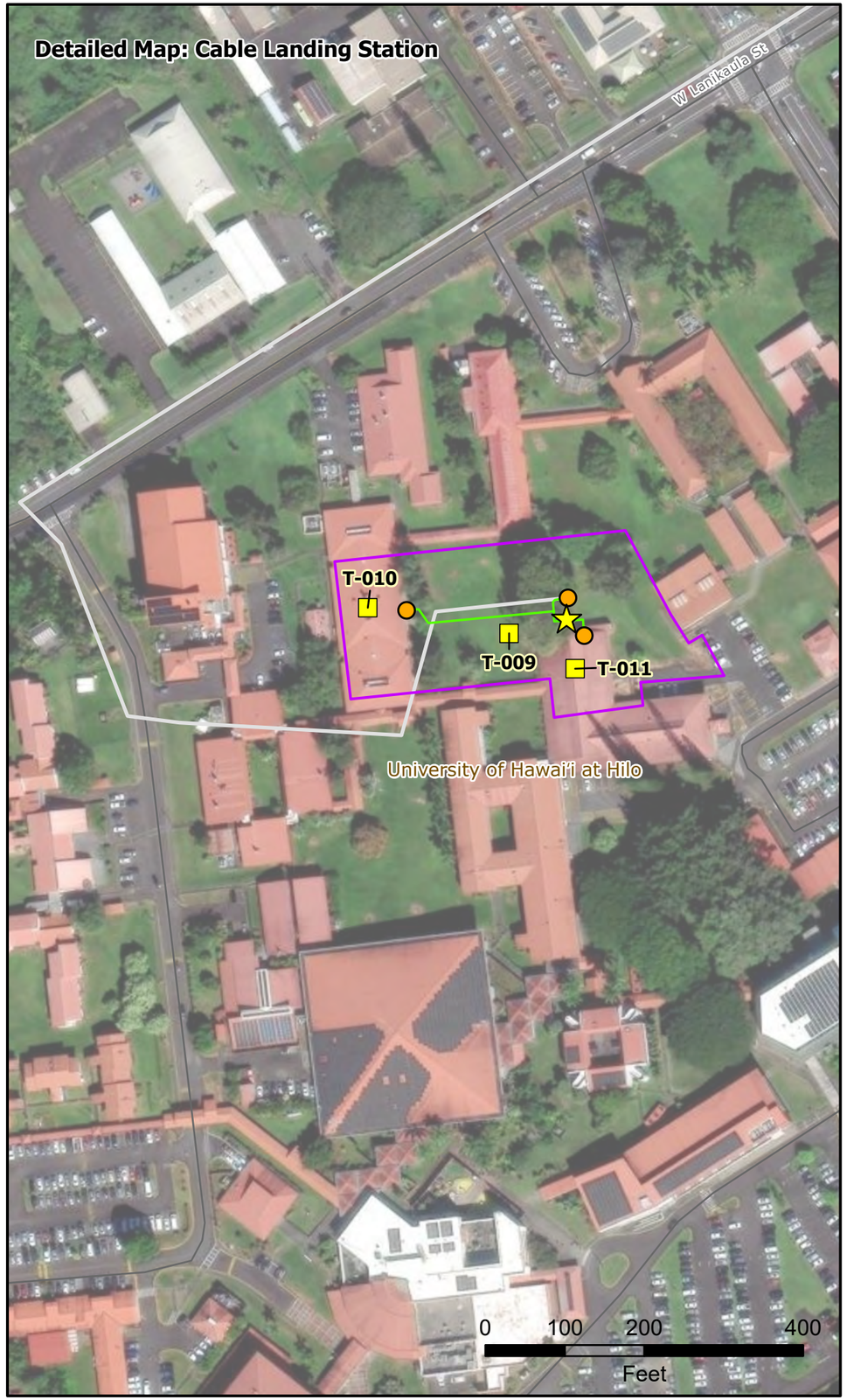
Date: 11/2025

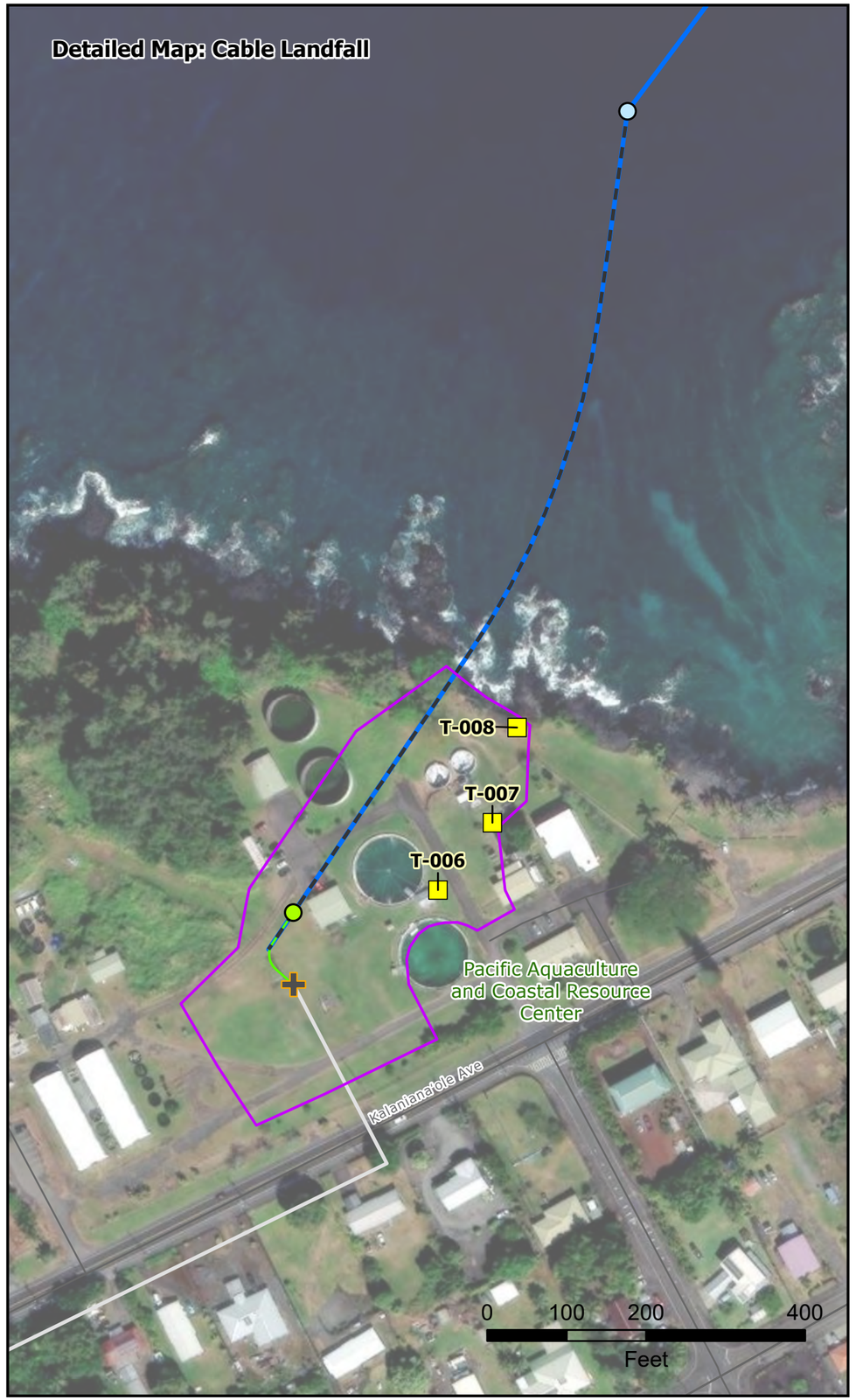
Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt\local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\15_HistoricProperties\ONI_HIFL_DraftEA_HistoricProperties_20251107.aprx





Hawaiian Islands Fiber Link

Figure 14.5

Hawai'i Island Cable Landing Site: Historic Properties

Project Area

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 3)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Potential Historic Properties

- Potential Historic Property

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1 2 4
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 12/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA15_HistoricProperties\ONI_HIFL_DraftEA_HistoricProperties_20251124.aprx





Hawaiian Islands Fiber Link

Figure 15.1

Kauaʻi Cable Landing Site: State Land Use Districts

- Project Area
- TMK Parcel
- Roads

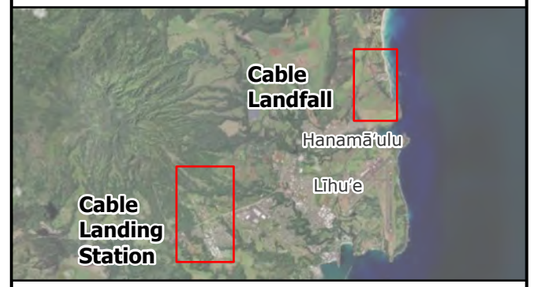
Proposed Project Infrastructure

- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 1)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System
- Third-Party Underground Conduit

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

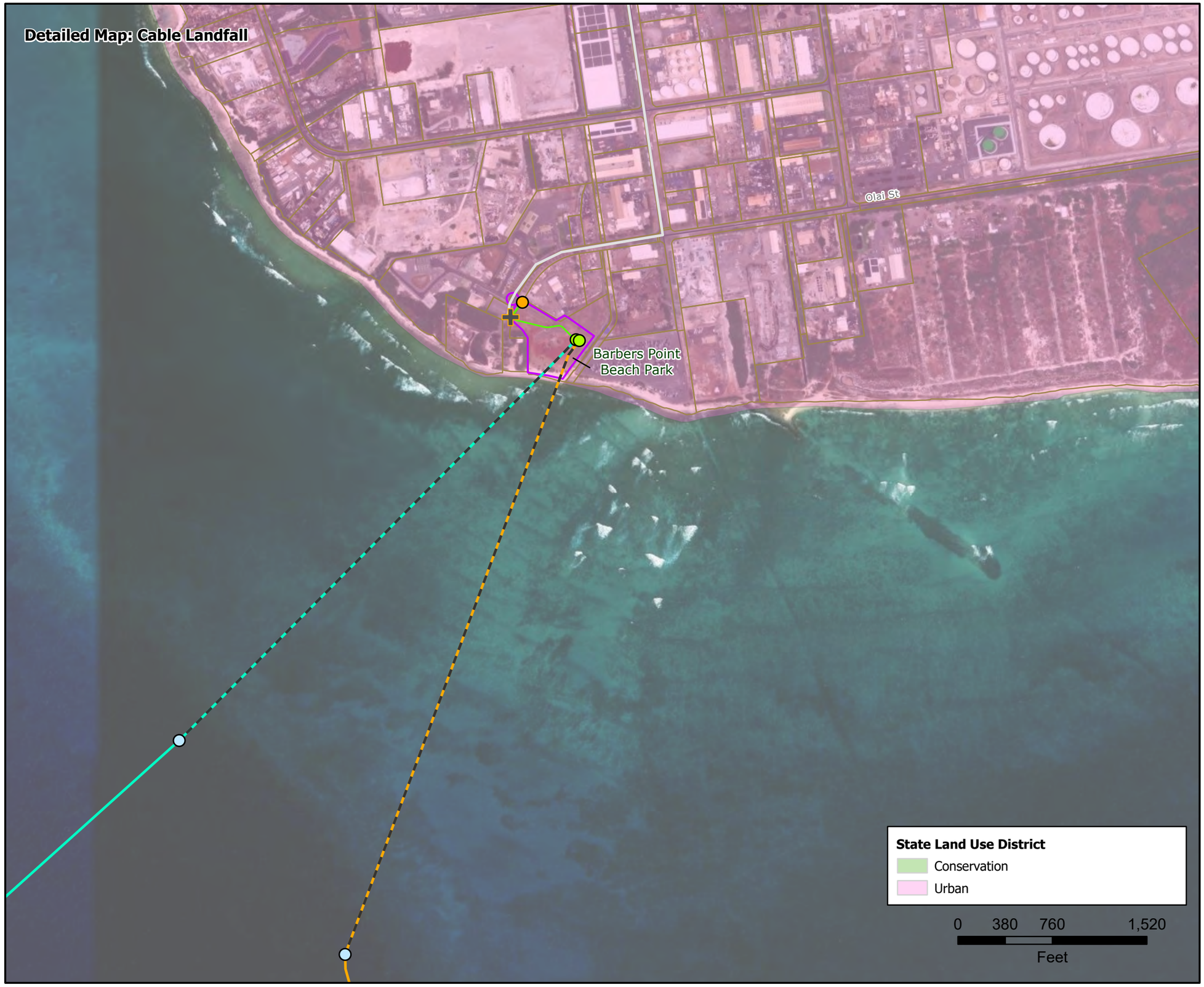
Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt\local\GIS\US\CES\Projects\PDX\OceanNetworks\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\16_State_Land_Use\ONI_HIFL_DraftEA_StateLandUse_20251117.aprx



Hawaiian Islands Fiber Link

Figure 15.2

Oʻahu Cable Landing Site: State Land Use Districts

- Project Area
- TMK Parcel
- Roads

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 1)
- Subsea Cable (Segment 2)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\tt.local\GIS\USCES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\16_State_Land_Use\ONI_HIFL_DraftEA_StateLandUse_20251117.aprx

Hawaiian Islands Fiber Link

Figure 15.3
Maui Cable Landing Site: State Land Use Districts



- Project Area
- TMK Parcel
- Roads

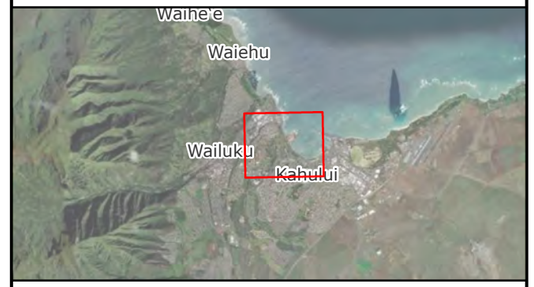
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 01/2026

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt-local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\16_State_Land_Use\ONI_HIFL_DraftEA_StateLandUse_20260119.aprx





Hawaiian Islands Fiber Link

Figure 15.4

Molokai Cable Landing Site: State Land Use Districts

- Project Area
- TMK Parcel
- Roads

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2A)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1 2
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt-local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\16_State_Land_Use\ONI_HIFL_DraftEA_StateLandUse_20251117.aprx

Hawaiian Islands Fiber Link

Figure 15.5

Lānaʻi Cable Landing Site: State Land Use Districts

Mānele Road

Mānele Small Boat Harbor

State Land Use District
- Agricultural
- Conservation
- Urban

0 250 500 1,000
Feet

- Project Area
- TMK Parcel
- Roads

Proposed Project Infrastructure
- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 2B)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure
- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

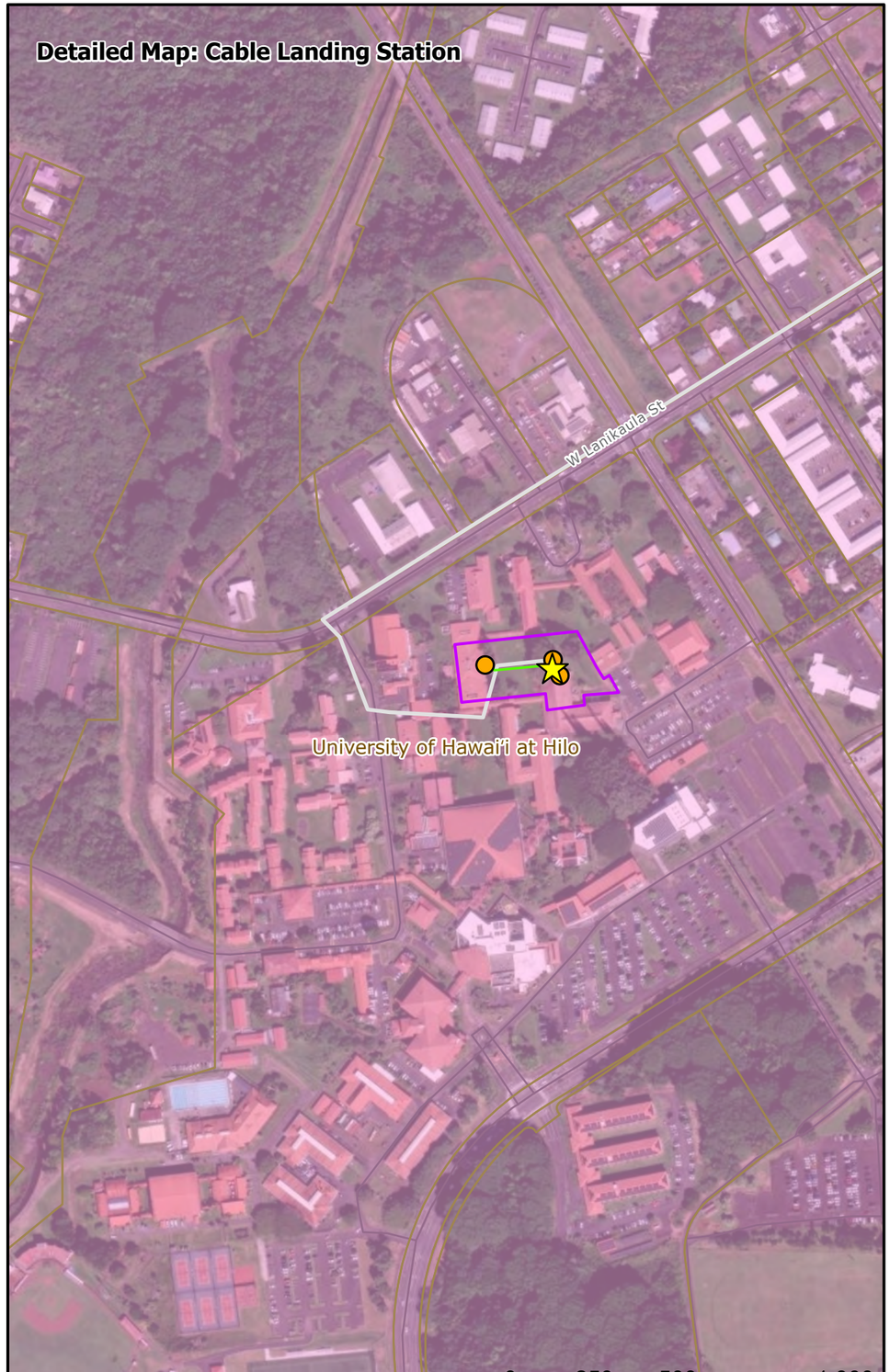
Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA\16_State_Land_Use\ONI_HIFL_DraftEA_StateLandUse_20251117.aprx





Hawaiian Islands Fiber Link

Figure 15.6

Hawai'i Island Cable Landing Site: State Land Use Districts

- Project Area
- TMK Parcel
- Roads

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 3)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1 2 4
Miles

N
W E
S

Prepared For: Ocean Networks

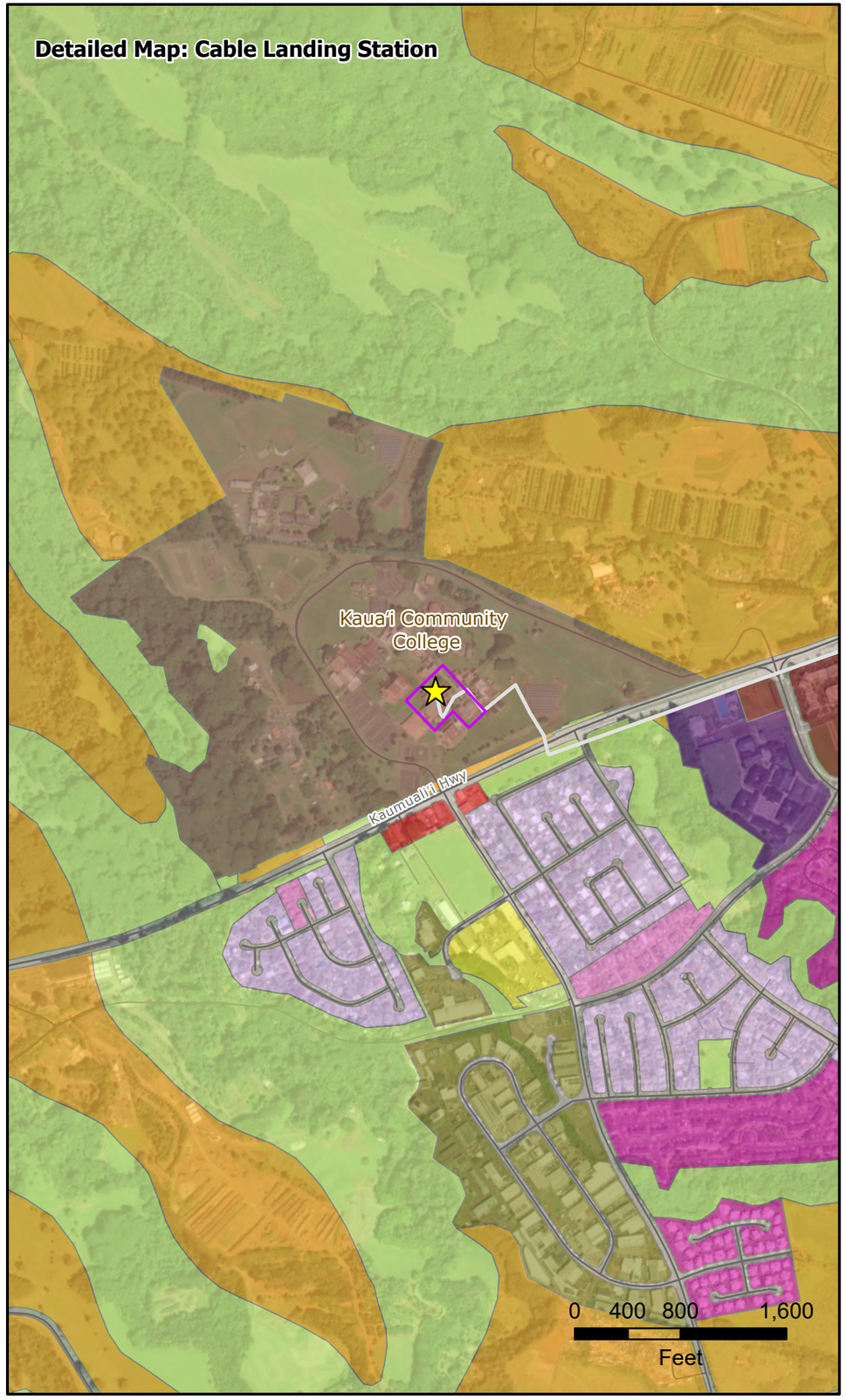
Prepared By:	Date: 12/2025

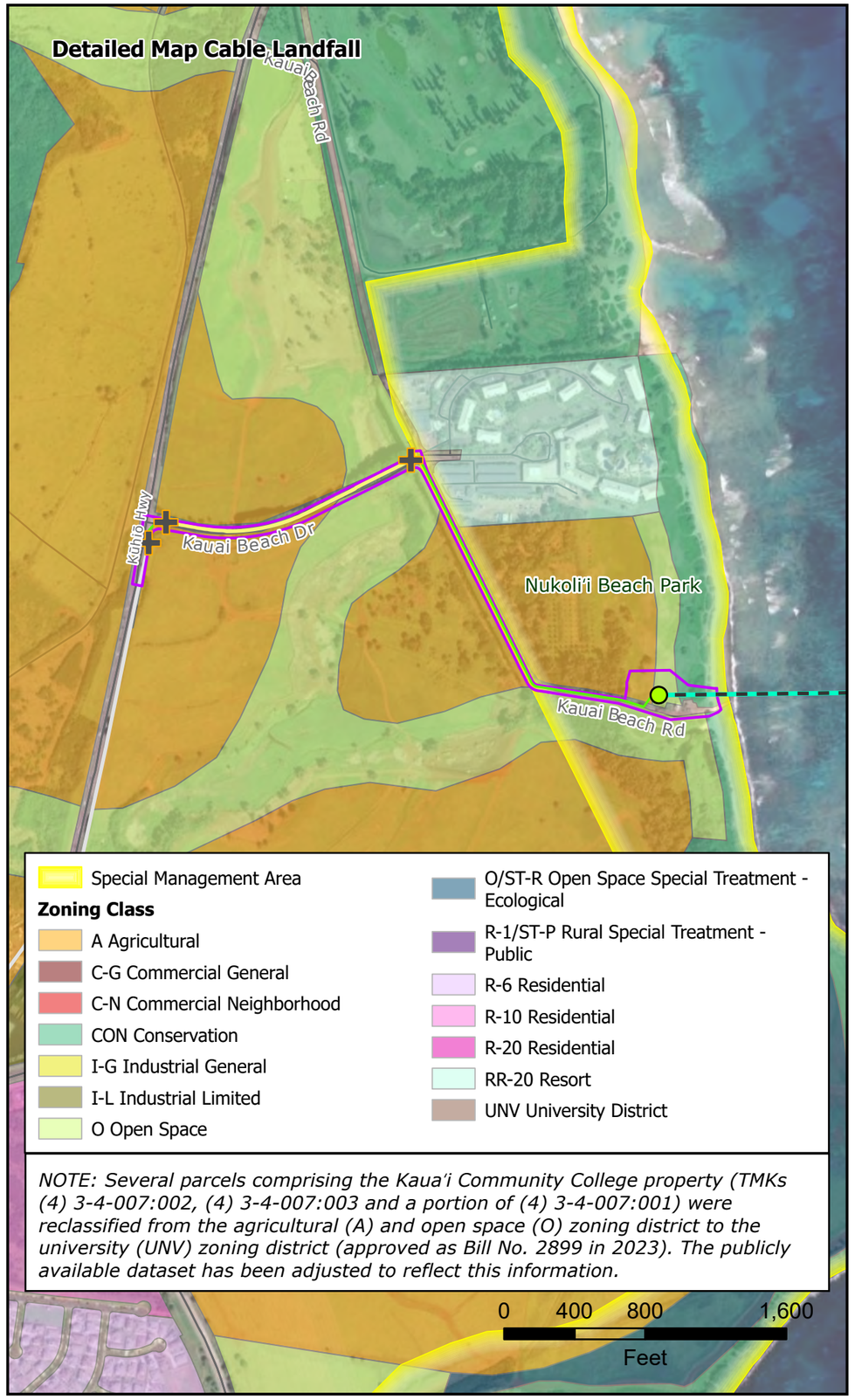
Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\16_State_Land_Use\ONI_HIFL_DraftEA_StateLandUse_20251117.aprx





NOTE: Several parcels comprising the Kaua'i Community College property (TMKs (4) 3-4-007:002, (4) 3-4-007:003 and a portion of (4) 3-4-007:001) were reclassified from the agricultural (A) and open space (O) zoning district to the university (UNV) zoning district (approved as Bill No. 2899 in 2023). The publicly available dataset has been adjusted to reflect this information.

Hawaiian Islands Fiber Link

Figure 16.1

Kauaʻi Cable Landing Site: County Zoning and Special Management Area

- Project Area
- Roads

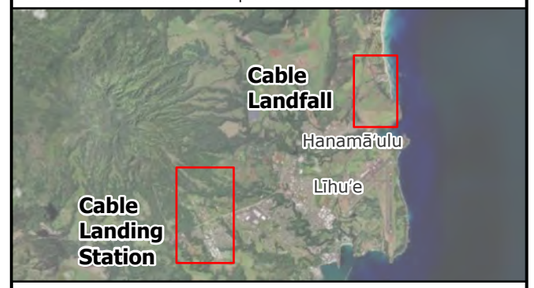
Proposed Project Infrastructure

- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 1)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System
- Third-Party Underground Conduit

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

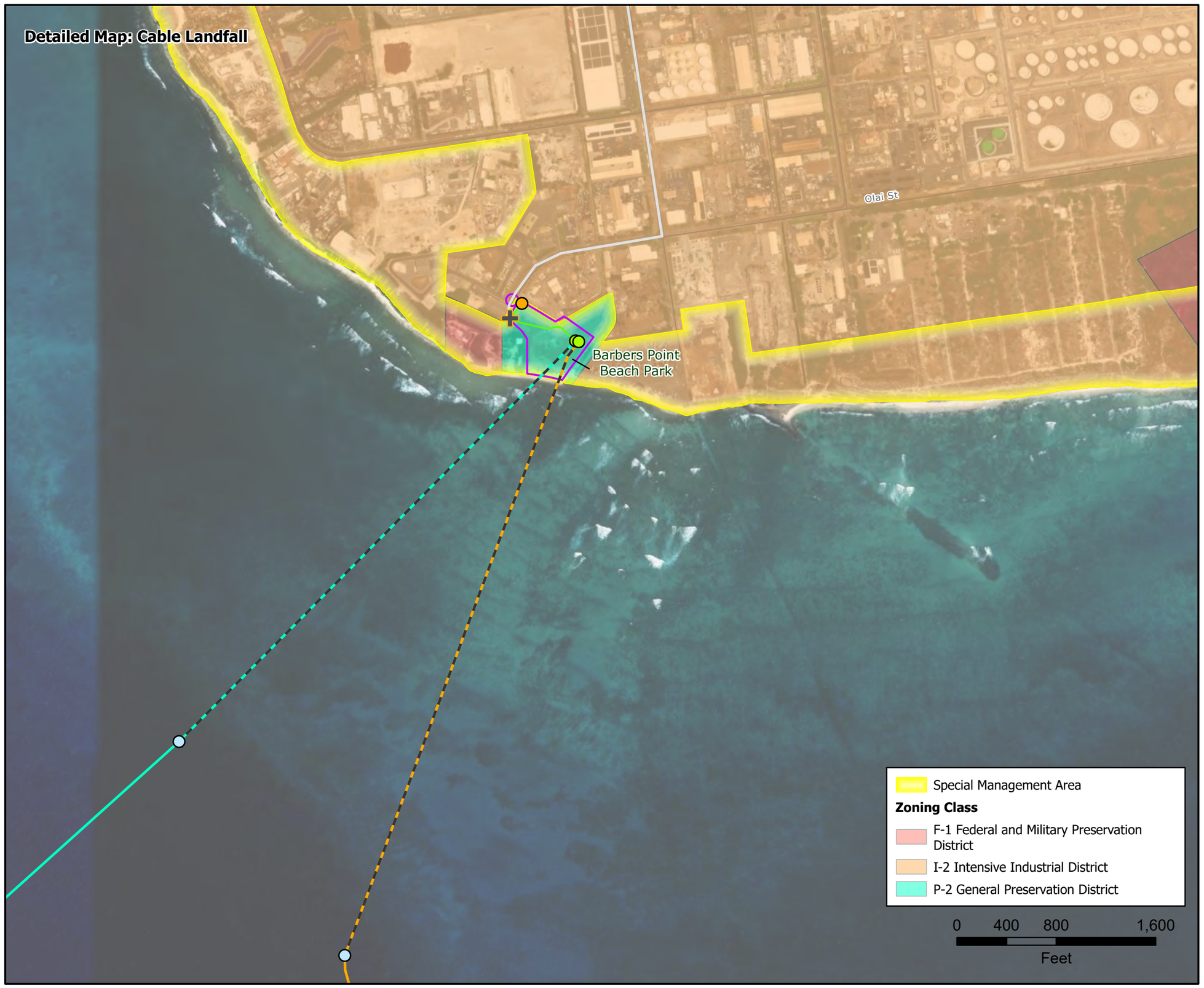
Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA17_County_Zoning_and_SMA\ONI_HIFL_DraftEA_CountyZoning_SMA_20251117.aprx



Hawaiian Islands Fiber Link

Figure 16.2

Oʻahu Cable Landing Site: County Zoning and Special Management Area

- Project Area
- Roads

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Terrestrial Cable (Underground Conduit)
- Subsea Cable (Segment 1)
- Subsea Cable (Segment 2)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

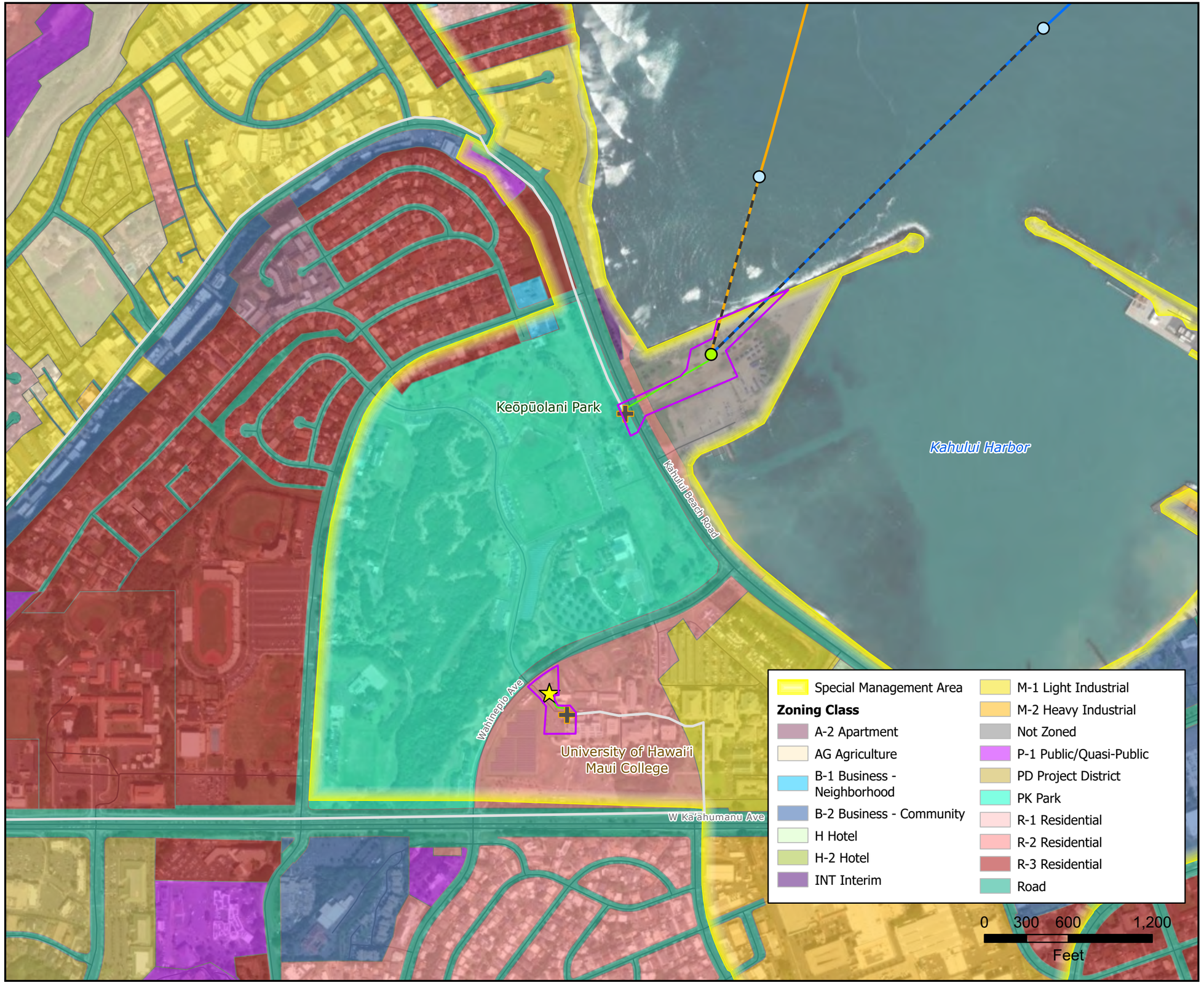
Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA\17_County_Zoning_and_SMA\ONI_HIFL_DraftEA_CountyZoning_SMA_20251022.aprx

Hawaiian Islands Fiber Link

Figure 16.3
Maui Cable Landing Site: County Zoning and Special Management Area



Project Area

Roads

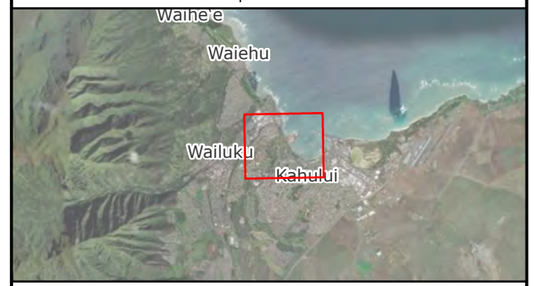
Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)
- Borehole

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6

Miles

N W E S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\US\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__DraftEA17_County_Zoning_and_SMA\ONI_HIFL_DraftEA_CountyZoning_SMA_20251022.aprx





Hawaiian Islands Fiber Link

Figure 16.4

Molokai Cable Landing Site: County Zoning and Special Management Area

Project Area

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Subsea Cable (Segment 2A)
- Terrestrial Cable (Underground Conduit)
- Borehole

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1 2
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

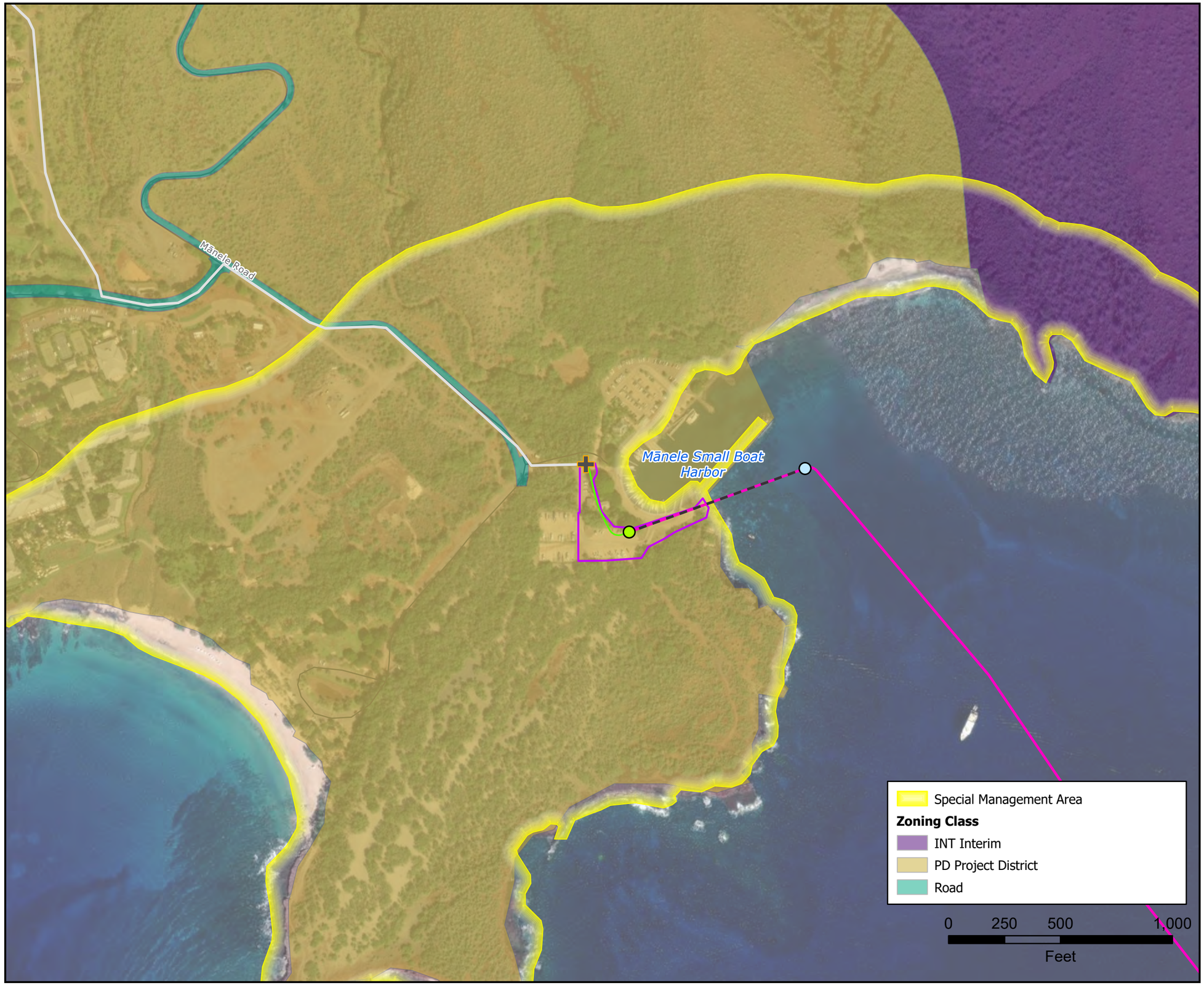
Not for Construction

Document Path: \\tt\local\GIS\US\CES\Projects\PDX\OceanNetworks\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\17_County_Zoning_and_SMA\ONI_HIFL_DraftEA_CountyZoning_SMA_20251022.aprx

Hawaiian Islands Fiber Link

Figure 16.5

Lānaʻi Cable Landing Site: County Zoning and Special Management Area



- Project Area
- Roads

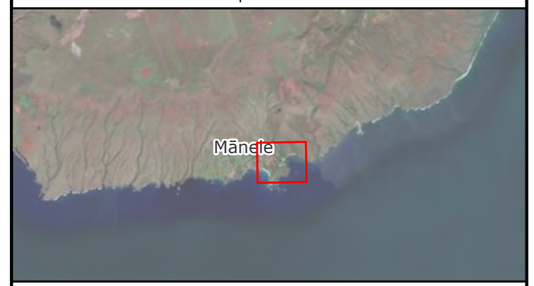
Proposed Project Infrastructure

- Beach Manhole
- Seabed Punchout Point
- Transition Between New Underground Conduit and Existing Utility System
- Borehole
- Subsea Cable (Segment 2B)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1.5 3 6
Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 11/2025

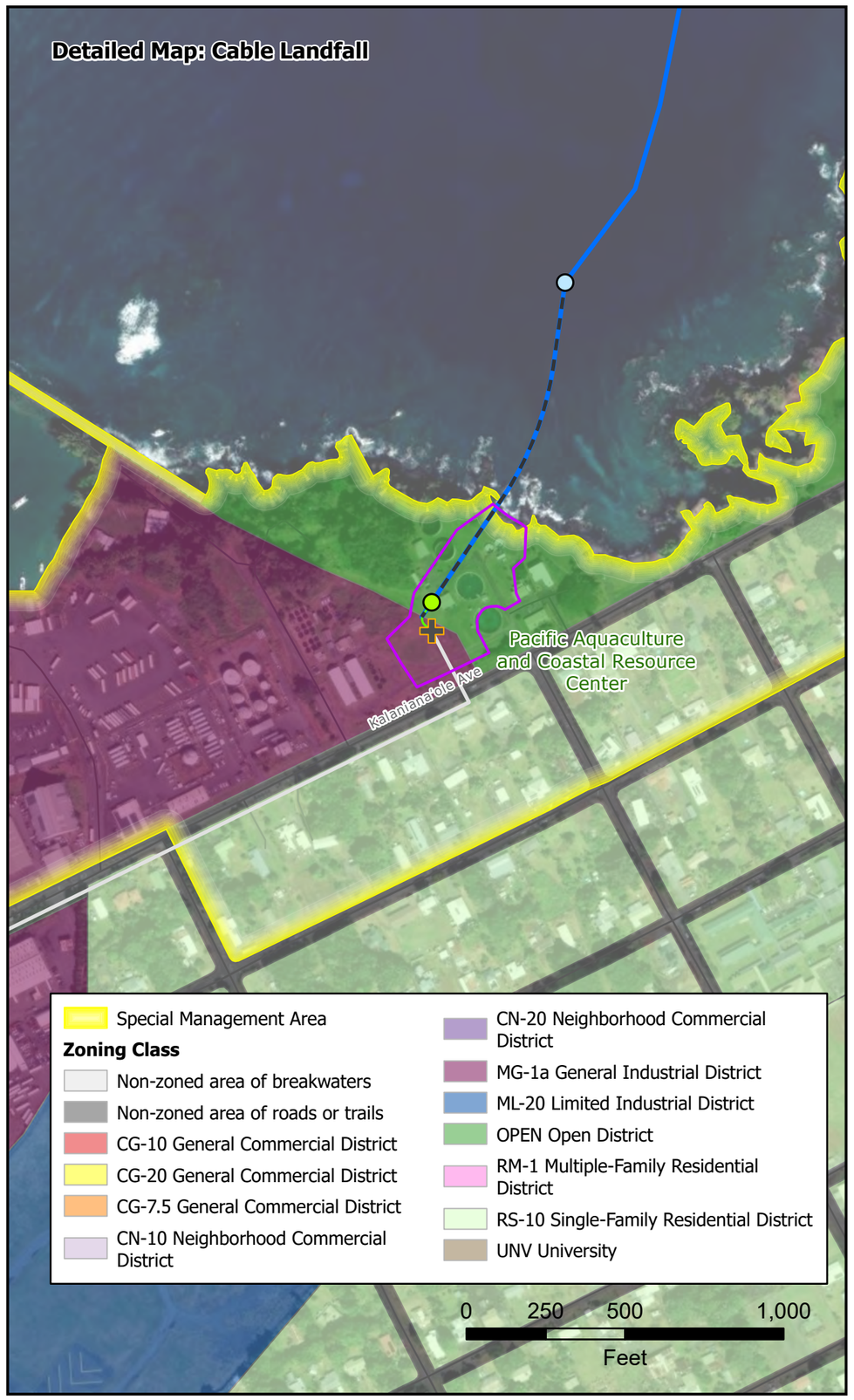
Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\tt.local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps__Draft\EA117_County_Zoning_and_SMA\ONI_HIFL_DraftEA_CountyZoning_SMA_20251022.aprx





Hawaiian Islands Fiber Link

Figure 16.6

Hawai'i Island Cable Landing Site: County Zoning and Special Management Area

Project Area

Roads

Proposed Project Infrastructure

Seabed Punchout Point

Beach Manhole

Utility Connection Point

Transition Between New Underground Conduit and Existing Utility System

Cable Landing Station

Borehole

Terrestrial Cable (Underground Conduit)

Subsea Cable (Segment 3)

Third-Party Infrastructure

Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 1 2 4

Miles

N

W E

S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 12/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\tt-local\GIS\USICES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps_DraftEA\17_County_Zoning_and_SMA\ONI_HIFL_DraftEA_CountyZoning_SMA_20251117.aprx

APPENDIX A
LETTER FROM GOVERNOR GREEN REGARDING HRS CHAPTER 343 COMPLIANCE

UNIVERSITY of HAWAI'I®
SYSTEM
'Ōnaehana Kulanui o Hawai'i

Garret T. Yoshimi
Vice President for Information Technology
and Chief Information Officer

2410136

October 8, 2024

MEMORANDUM

TO: The Honorable Josh Green, M.D.
Governor, State of Hawai'i

THROUGH: The Honorable Sylvia Luke
Lieutenant Governor, State of Hawai'i

FROM: Garret T. Yoshimi
Vice President for Information Technology and Chief Information Officer

SUBJECT: Request for Governor to Delegate Approving Authority for HIFL project Chapter 343 Environmental Review to the University of Hawai'i

The University of Hawai'i's VP for Information Technology and CIO (VPIT) currently manages the US Treasury Capital Projects Fund (CPF) program investments for the State of Hawai'i, under a sub-award from the Office of the Governor, through the Department of Budget and Finance. The Hawaiian Islands Fiber Link (HIFL) project funded by CPF is in the process of building a new inter-island submarine fiber optic cable system to address a long standing critical need for new capacity connecting our islands. The HIFL project has progressed through the design phase, and is ready to conduct the required environmental review under HRS Chapter 343. Under Chapter 343, given the significant investment of the state's CPF funds, the environmental review process under which HIFL will submit its Environmental Assessment (EA) and/or Environmental Impact Statement (EIS) will be an "Agency Action" (since the project is conducted with a substantial amount of state CPF-sourced funds).

BACKGROUND

The CPF program provides $115.4m to the State of Hawai'i, authorized under the American Rescue Plan Act (ARPA). The state's approved programs under CPF include allocating the majority of the amount to the establishment of a new inter-island submarine fiber optic cable system to provide new commercial capacity to directly address the critical needs of Hawai'i for capacity and resilience in its core telecommunications infrastructure. The new system, HIFL, will fill the unmet need for new, high capacity, inter-island connectivity that would otherwise be at risk given the lack of new investment by commercial operators over the past decades. HIFL is a partnership with a private entity, Ocean Networks, Inc. (ONI), with the state as represented by my office, to design, build and operate the new inter-island submarine fiber optic cable system. As required by the CPF program, the new system will be open access and available for commercial use to fill the critical infrastructure gap for many years to come.

2520 Correa Road, IT Center, 6th Floor
Honolulu, Hawai'i 96822
Telephone: (808) 956-3501
Fax: (808) 956-7322
An Equal Opportunity/Affirmative Action Institution

The HIFL effort has proceeded through the design process, including selection of the necessary locations and physical pathways, and is prepared to enter into the complex permitting process required for the system to be fully built. A critical step for the project is the HRS Chapter 343 environmental review process, that will fully assess the potential impacts of the system implementation, and help to clear the way for the physical installation activities to begin. Under Chapter 343, we recommend pursuing the environmental review process as an "Agency Action" given the substantial investment by the state (of its federal funds) in the design and implementation of HIFL. As an Agency Action, with statewide beneficial impacts, the Governor or Governor's authorized representative would be the authority to review and accept the EA and/or EIS. We are requesting the Governor designate UH as the responsible agency and approving authority for HIFL. ONI would conduct the review and all steps necessary to prepare the EA and/or EIS as required, and UH would provide oversight, review and necessary approvals on behalf of the Governor.

ACTION REQUESTED

Under a Chapter 343 Agency Action for the HIFL project, we respectfully request that UH be designated as the Governor's authorized representative in the preparation, review and approval of the EA, including the determination as to whether an EIS is required. UH would have the EA prepared by its contractor, ONI, and the EA would be reviewed by the UH Office of Strategic Development and Partnership (OSDP). UH OSDP is the entity responsible for the coordination of real property administration for all UH statewide locations. In conducting its review and determination of the HIFL EA and/or EIS, UH OSDP would coordinate work with the UH VPIT to ensure any technical and project matters are fully resolved.

Please feel free to reach out to me with any questions.

☑ Concur ☐ Do Not Concur

Josh Green M.D.

Josh Green M.D., Governor, State of Hawai'i

NOV 0 8 2024

Date

APPENDIX B
EQUIPMENT SPECIFICATION SHEETS

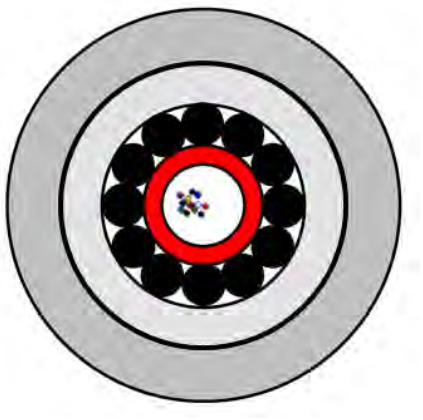
NSW MINISUB 36 LWP

For Project NSW24155

Prysmian NSW

A Brand of Prysmian Group

Cable Design



DESIGN & CONSTRUCTION

- Bundled Optical Fibers
- Thixotropic Filling Compound
- Copper Buffer Tube, 5 mm Diameter
- 12 Steel Wires, 1.7 mm Diameter
- HDPE Sheath, 1.7 mm nominal Thickness
- Corrugated Steel Tape
- HDPE Sheath, 1.5 mm nominal Thickness

Cable description

MINISUB submarine cables are designed around a very tough and rigid seam-welded central copper tube which contains the required number of fibers and is filled with a hydrogen absorbing thixotropic filling compound. Preformed high tensile strength steel wires are covering the copper tube to maintain mechanical protection against typical installation stress. An HDPE sheath is sealing the cable construction from water ingress. A layer of corrugated steel tape and an outer HDPE sheath giving additional mechanical protection.

Mechanical Parameter	Unit	Value
Cable Outer Diameter	mm	17
Fiber Count up to		48[1]
Weight in air	kg / km	550
Weight in seawater	kg / km	330
Specific gravity in seawater		2.50
Minimum bending radius (MBR) with load	mm	800
Cable Breaking Load (CBL)	kN	50
Tension		
Dynamic (NTTS)	kN	40
Operational (NOTS)	kN	35
Static (NPTS)	kN	15
Operating temperature range	°C	-30 to +60
Installation temperature range	°C	-15 to +60
Storage temperature range	°C	-30 to +70
Water depth up to	m	5 000

[1] with 250µm fibers for up to 36 fibers and 200µm fibers for more than 36 fibers

24NSW-SE-DTS-222639-MINISUB 36 LWP with 48 fibers-v1.0

© PRYSMIAN GROUP 2020, All Rights Reserved
All sizes and values without tolerances are reference values. Specifications are for product as supplied by Prysmian: any modification or alteration afterwards of product may give different result. The information contained within this document must not be copied, reprinted or reproduced in any form, either wholly or in part, without the written consent of Prysmian. The information is believed to be correct at the time of issue. Prysmian reserves the right to amend this specification without prior notice. This specification is not contractually valid unless specifically authorized by Prysmian.

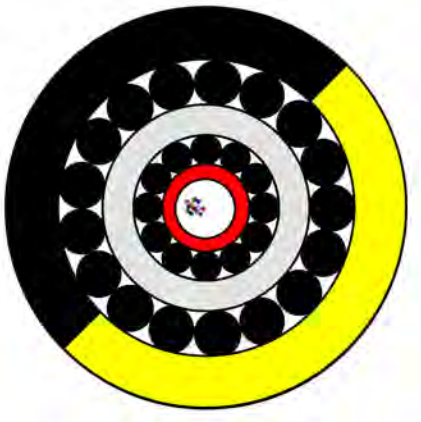
NSW MINISUB 36 SA

For Project NSW24155

Prysmian NSW

A Brand of Prysmian Group

Cable Design



DESIGN & CONSTRUCTION

- Bundled Optical Fibers
- Thixotropic Filling Compound
- Copper Buffer Tube, 5 mm Diameter
- 12 Steel Wires, 1.7 mm Diameter
- HDPE Sheath, 1.7 mm nominal Thickness
- 17 Steel Wires, 2.6 mm Diameter
- PP Yarns (black/yellow)

Cable description

MINISUB submarine cables are designed around a very tough and rigid seam-welded central copper tube which contains the required number of fibers and is filled with a hydrogen absorbing thixotropic filling compound. Preformed high tensile strength steel wires are covering the copper tube to maintain mechanical protection against typical installation stress. An HDPE sheath is sealing the cable construction from water ingress. A single-armor layer of preformed high tensile strength steel wires giving additional mechanical protection. An outer layer of PP-yarns provides best handling performance.

Mechanical Parameter		Unit	Value
Cable Outer Diameter		mm	23
Fiber Count	**up to**		48[1]
Weight in air		kg / km	1 170
Weight in seawater		kg / km	930
Specific gravity in seawater			4.88
Minimum bending radius (MBR) with load		mm	1 000
Cable Breaking Load (CBL)		kN	215
Tension			
Dynamic (NTTS)		kN	180
Operational (NOTS)		kN	130
Static (NPTS)		kN	65
Operating temperature range		°C	-30 to +60
Installation temperature range		°C	-15 to +60
Storage temperature range		°C	-30 to +70
Water depth (system)	**up to**	m	1 500
Water depth (stand-alone)	**up to**	m	3 000

[1] with 250µm fibers for up to 36 fibers and 200µm fibers for more than 36 fibers

24NSW-SE-DTS-222637-MINISUB 36 SA with 48 fibers-v1.0

© PRYSMIAN GROUP 2020, All Rights Reserved
All sizes and values without tolerances are reference values. Specifications are for product as supplied by Prysmian: any modification or alteration afterwards of product may give different result. The information contained within this document must not be copied, reprinted or reproduced in any form, either wholly or in part, without the written consent of Prysmian. The information is believed to be correct at the time of issue. Prysmian reserves the right to amend this specification without prior notice. This specification is not contractually valid unless specifically authorized by Prysmian.

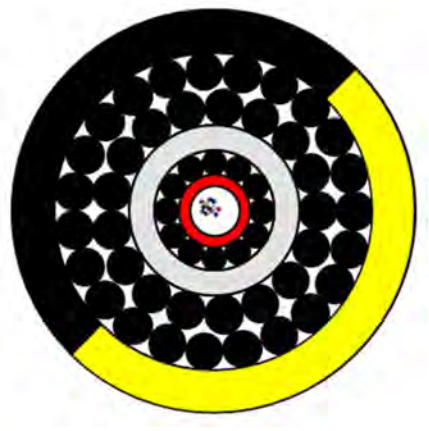
NSW MINISUB 36 DA

For Project NSW24155

Prysmian NSW

A Brand of Prysmian Group

Cable Design



DESIGN & CONSTRUCTION

- Bundled Optical Fibers
- Thixotropic Filling Compound
- Copper Buffer Tube, 5 mm Diameter
- 12 Steel Wires, 1.7 mm Diameter
- HDPE Sheath, 1.7 mm nominal Thickness
- 17 Steel Wires, 2.6 mm Diameter
- 23 Steel Wires, 2.6 mm Diameter
- PP Yarns (black/yellow)

Cable description

MINISUB submarine cables are designed around a very tough and rigid seam-welded central copper tube which contains the required number of fibers and is filled with a hydrogen absorbing thixotropic filling compound. Preformed high tensile strength steel wires are covering the copper tube to maintain mechanical protection against typical installation stress. An HDPE sheath is sealing the cable construction from water ingress. A double-armor layer of preformed high tensile strength steel wires giving additional mechanical protection. An outer layer of PP-yarns provides best handling performance.

Mechanical Parameter		Unit	Value
Cable Outer Diameter		mm	28
Fiber Count	**up to**		48[1]
Weight in air		kg / km	2 160
Weight in seawater		kg / km	1 760
Specific gravity in seawater			5.40
Minimum bending radius (MBR) with load		mm	1 000
Cable Breaking Load (CBL)		kN	440
Tension			
Dynamic (NTTS)		kN	360
Operational (NOTS)		kN	265
Static (NPTS)		kN	130
Operating temperature range		°C	-30 to +60
Installation temperature range		°C	-15 to +60
Storage temperature range		°C	-30 to +70
Water depth (system)	**up to**	m	600
Water depth (stand-alone)	**up to**	m	3 000

[1] with 250µm fibers for up to 36 fibers and 200µm fibers for more than 36 fibers

24NSW-SE-DTS-222638-MINISUB 36 DA with 48 fibers-v1.0

© PRYSMIAN GROUP 2020, All Rights Reserved
All sizes and values without tolerances are reference values. Specifications are for product as supplied by Prysmian: any modification or alteration afterwards of product may give different result. The information contained within this document must not be copied, reprinted or reproduced in any form, either wholly or in part, without the written consent of Prysmian. The information is believed to be correct at the time of issue. Prysmian reserves the right to amend this specification without prior notice. This specification is not contractually valid unless specifically authorized by Prysmian.

IT INFINITY



Specifications

M/V "VOLSTAD ST-216L CD TBN"
Platform Supply Vessel,
"green vessel" consept with clean design.

The vessel, designated ST-216L CD, is designed by Skipsteknisk AS for Owner Volstad Shipping AS.

The following features have been emphasized:
>> Environmentally friendly profile through Clean Design and SCR exhaust catalysts (option)
>> Low resistance hull lines designed for speed and low fuel consumption >> Operations in the Northern waters >> High redundancy
>> Standby Rescue
>> The vessel will be outfitted and prepared for platform supply services including transport of:
- Deck cargo
- Pipes
- Dry bulk
- Liquid cargo

TECHNICAL DETAILS
Classification: DNV +1A1, SF, E0, Dynpos AUTR, ICE-1B, DK(+), LFL*, CLEAN DESIGN, COMF-C3--V3 (at 80% thruster load), NAUT OSV, DE-ICE, OIL-REC (NOFO 2005), STAND-BY RESCUE (NMD 300 Survivors)
SOLAS 2004
MARPOL 1991

Tank Capacities (Approx):

Water ballast/Drillwater:	2520 m3
Fuel oil:	1390 m3
Potable water:	1050 m3
Liquid mud (dedicated):	770 m3
Brine (dedicated):	430 m3
Dry bulk:	360 m3
Base oil:	110 m3
Methanol / special products:	140 m3
Slop (combined with mud):	160 m3
Oil recovery capacity	1033 m3

Discharge Capacities:

Water ballast/drill water:	2x250m3/hour
Fuel oil:	1x250m3/hour
Potable water:	1x250m3/hour
Liquid mud:	2x100m3/hour
Brine:	2x100m3/hour
Dry bulk:	2x75t/hour
Base oil:	1x150m3/hour
Methanol:	2x100m3/hour
Sludge:	1x36 m3/hour

Machinery/Diesel Electric Propulsion/ Thrusters:

Generator sets:	4x1900 kW
	1x950 kW

Main propellers:

Azipull	120: 2x3500 kW
Tunnel thrusters super silent:	2x880 kW
Retractable azimuth in bow:	1x880 kW

Speed:

Trial speed:	Abt.18.2 knots
Service speed	Abt.16.0 knots

Navigation Equipment:
>> Two radars
>> Three gyrocompasses
>> One magnetic projector compass
>> Auto pilot
>> One DGPS navigation plant
>> ECDIS as per NAUT OSV
>> DP System
>> DP Reference Systems
>> Joystick

Radio Communication Equipment:
>> Radio equipment in accordance with GMDSS Area 3.
>> Satellite com with bandwidth min. 256kb/sec VHF, Mobile Intercom.

Main Dimensions:

Length over all:	93,40 m
Length between p.p.	82,20 m
Breadth moulded:	19,20 m
Depth to main deck:	8,40 m
Min. draft about:	4,2 m
Max draft (NMD)/Summerdraft:	6,85 m
Freeboard (max draft NMD):	1,55 m
Cargo rail height:	3,8 m

Tonnage:

GT:	4200 t
NRT:	1260 t
Light ship weight:	3100 t
Cargo Capacity (t = m. tonnes):	
Deadweight at max draft:	5150 t
Deadweight at 6,4 meter draft:	4500 t
Displacement:	8263 t

Deck:

Deck area:	1060,0 m2
Deck length (wood covered):	66,3 m
Deck breadth (net) (wood cov.):	16,0 m
Max deck load vcg 1m ab. deck	2950 t
Deck strength:	10 t/m2

Discharge Stations / Discharge Pipes Dimensions / Placement:

Water ballast/ drill water:	4”/9 bar
Fuel oil:	4”/9 bar
Potable water:	4”/9 bar
Liquid mud:	4”/24 bar
Brine:	4”/24 bar
Dry bulk:	5”/6 bar
Base oil:	4”/9 bar
Methanol/special products:	4”/9 bar
Slop (comb. with mud/oro):	4”/9 bar
Slop discharge:	SB
Sludge:	SB
Methanol discharge:	P/SB
All other liquids discharge:	P/SB/Aft

Anti-Rolling Tanks:

4 passive anti-rolling tanks abt.	650 m3

Agitatos:
In mud and brine tanks

Tank Washing System:
In mud and brine tanks with hot water

Deck Equipment Machinery/Moorings:

Tugger winches:	2 x 20 t
Capstans:	2 x 10 t
Lashing winches:	6 x 2 t
Stanchions:	15 pcs.
Cranes:	1 x 4t/10 m 1x1,5t/8 m
Mooring winches	2 x 10 t
Power Outlets for containers on cargo deck:	20 pcs.

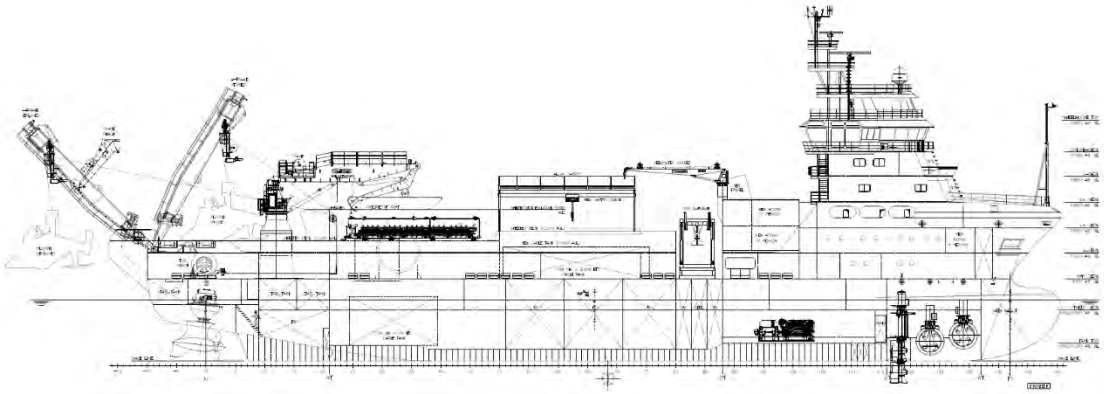
Accommodation:

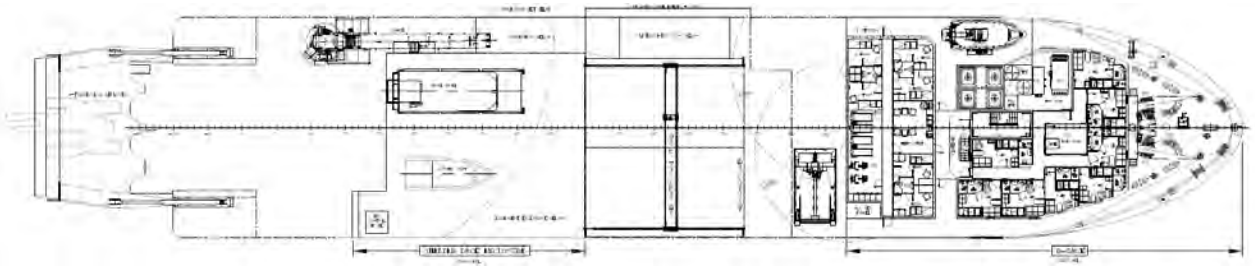
Total Capacity:	28
Single Cabins	12
Twin Cabins	8
All cabins have separate bathroom.	
Mess room and 2 lounges	90 m2
Ship’s office	22 m2
Hospital	20 m2
Gymnasium	12 m2
Laundry	7 m2
Wardrobe/duty mess	20 m2
Freezer:	20 m2
Coolers:	32 m2

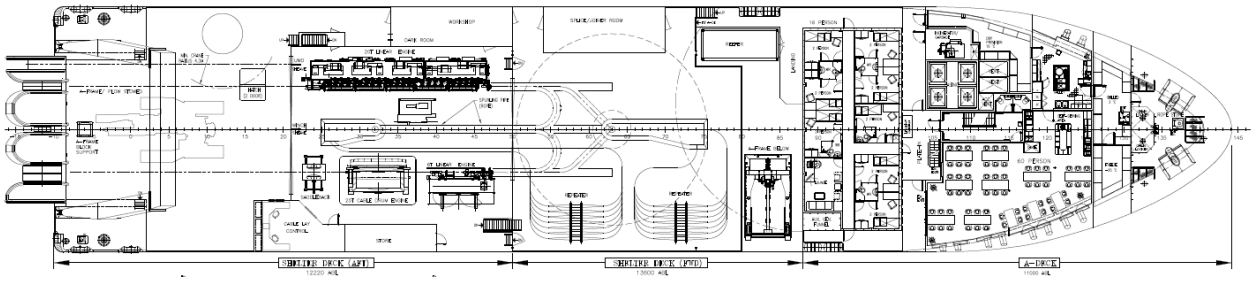
Contingency Equipment:
Fast rescue craft, MP 741 Springer with reversible gear box. Davit prepared for redundant boat. According to SOLAS for the specified class and number of crew. Rescue basket and equipment as per rescue class.

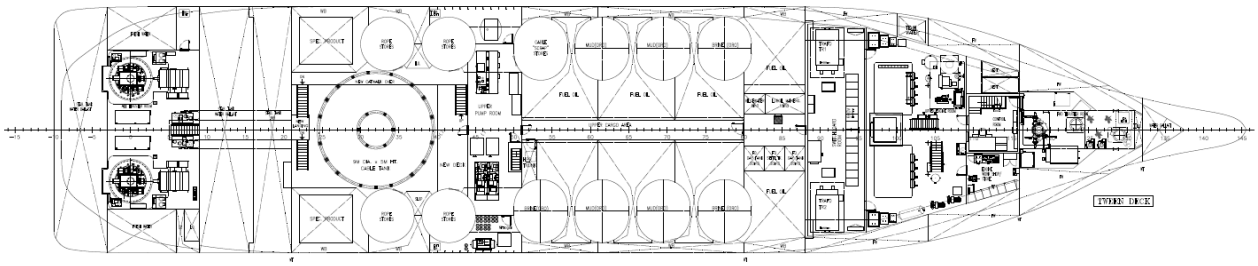
Other:
Incinerator Cyclon filters on dry bulk system Inert gas system (LFL*) Trunk for HIPAP

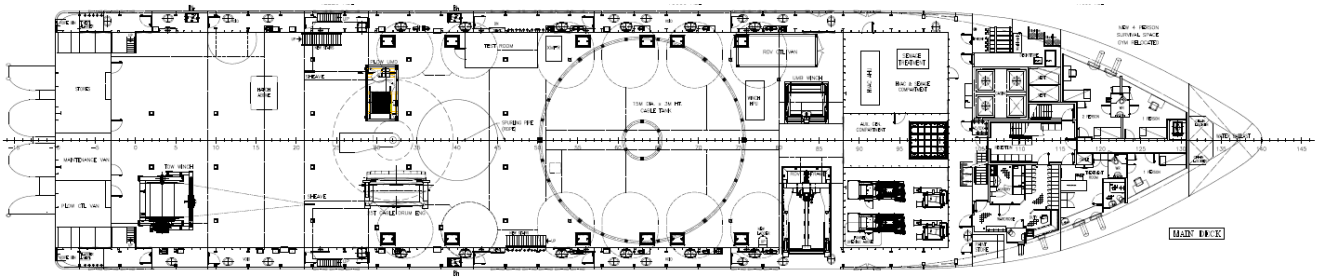
Options:
DE-ICE C, catalyst, HELDK-SH, Automatic cargo hose handling system, Automatic cargo securing system, FiFi II






SHELTER DECK (AFT)
SHELTER DECK (FWD)
A-DECK


TWEEN DECK


MAIN DECK

C.S. IT INTREPID



The IT Intrepid is a fully furnished cable ship capable of installation and maintenance activities in all ocean depths. The IT Intrepid is fitted with the IT ROVJET 207 and 1.5m Plough for cable work.

SPECIFICATIONS

DIMENSIONS
Length Overall 115.0m
Breadth Moulded 18.0m
Depth Moulded 10.1m
Max Draught 6.3m
Gross Tonnage 6141t
Port of registry ..... Barbados

CLASSIFICATION
ABS, A1, AMS, ACCU
(Previously LR Ice Class 3)
ABS DP Class 1

DYNAMIC POSITIONING
GE DPS 11

POWER AND PROPULSION
2 x Main engines at 2,200kW
2 x Auxiliary engines at 750kW
2 x Propulsion Motors at 2,000kW

EMERGENCY GENERATORS
1 x 350kW Caterpillar diesel

SPEED/ENDURANCE
Maximum Speed .....14 Knots
Cruising Speed .....12 Knots
Endurance....42 days @ 12 Knots

THRUSTERS
Bow Thruster.....1 x White Gill 750kW
Stern Thruster.....1 x White Gill 750kW

CABLE MACHINERY
2 x 3.5m dia. CDE, 40t max pulling capacity
18 wheel pair LCE, 18t max pulling capacity
1 x 1 wheel pair transporter

CAPACITY (Max)
2 x Main Tanks, 1 x Spare
Cable Load Capacity.....1200t (up to 1700t)
Cable Volume.....1232m^3
Repeaters Capacity.....45

CRANES/LIFTING CAPACITIES
Bow Gantry.....1 x 5t bow hoist
Fwd Stbd.....3t at 16m / 6t at 6.7m
Aft Port.....3t at 16m / 6t at 8m
ROV (Fwd Port).....9t at 10.5m / 21.5t at 4m

ACCOMMODATION
Officers and Crew 76
Passengers 10
Total Berths 86

A-FRAME
Certification .....ABS
SWL 25t
Weight.....45t

IT PLOW
Weight.....17t
Burial Depth.....up to 2m
Burial speed..... 0.6-1km/h
Bending Radius.....1.5m

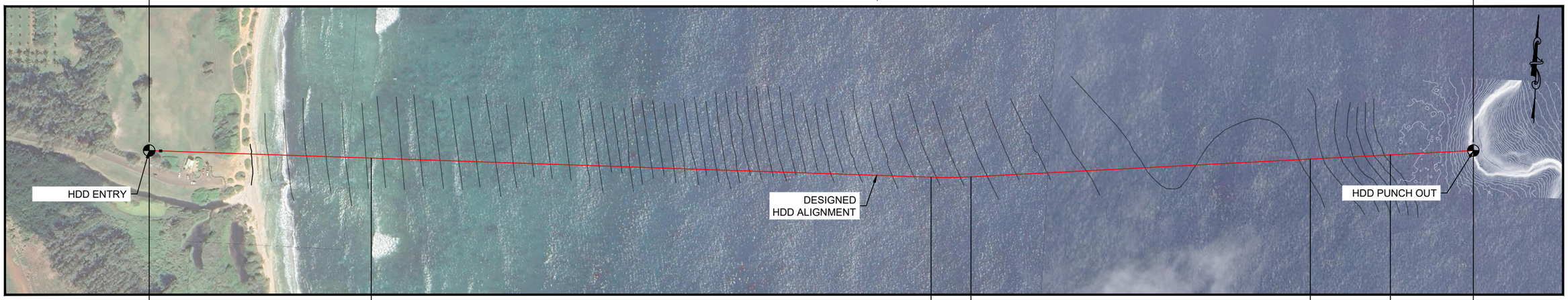
IT ROVJET 207
Operating Dept.....Up to 2600m
Power.....200hP
Max Payload.....54kg
Max Operation Sea State.....6
Burial up to 1.5m with cable depressor

ZODIAC RHIB (Zodiac 733IO)
Length Overall 7.24m
Beam max inflated 7.74m
Draft 0.53m
Max Horsepower 300
Person capacity ..... 15A + 0C

APPENDIX C
HDD PROFILES

NOT FOR CONSTRUCTION

HORIZONTAL REFERENCE LENGTH = 4,589'
TRUE DESIGNED LENGTH = 4,612'



PLAN

HDD ENTRY POINT @ 10°
0+00.00, 6.40, 0.00' RT.
N 62891.00, E 1695622.36

P.C. 10° SAG BEND
7+69.59, -129.38, 26.27' RT.
RADIUS = 1,600'

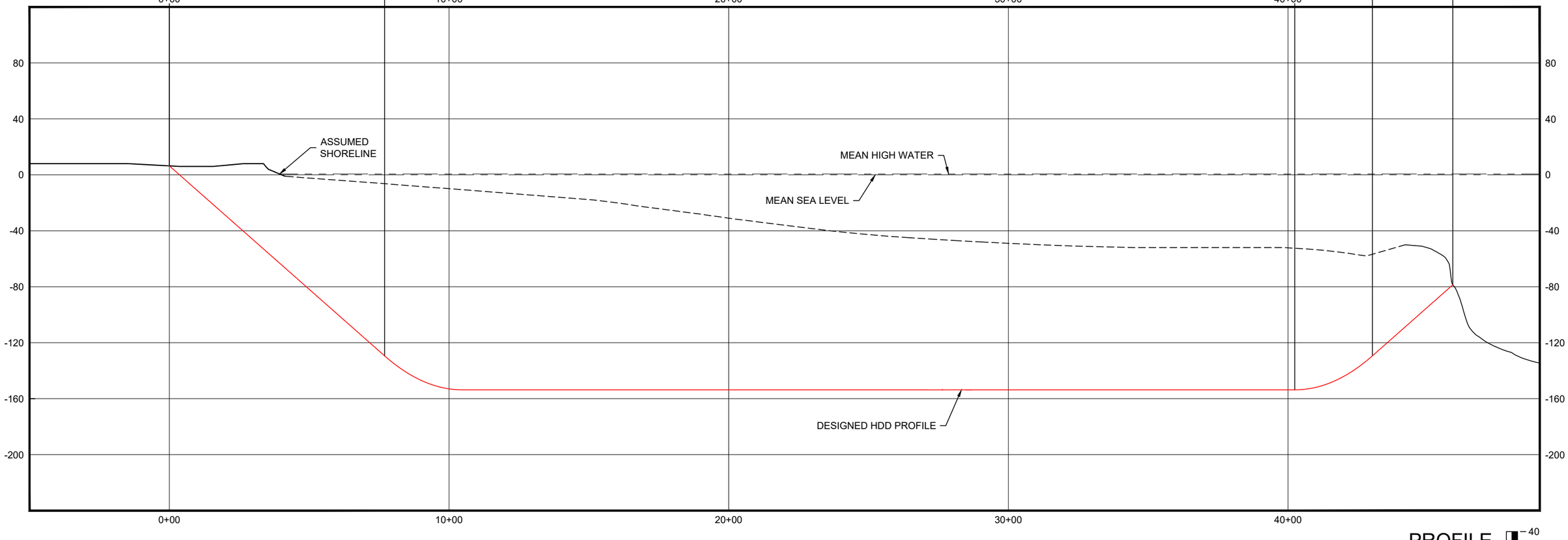
P.C. 4.96° SIDE BEND
27+09.76, -153.69, 92.50' RT.
RADIUS = 1,600'
N 62922.55, E 1698333.51

P.T. 4.96° SIDE BEND
28+48.09, -153.69, 91.24' RT.
N 62930.13, E 1698471.64

P.C. 10° SAG BEND
40+24.20, -153.69, 29.60' RT
RADIUS = 1,600'

P.T. 10° SAG BEND
43+01.65, -129.38, 15.06' RT.

HDD PUNCHOUT @ 10°
45+89.09, -78.63, 0.00' RT.
N 63100.92, E 1700206.64

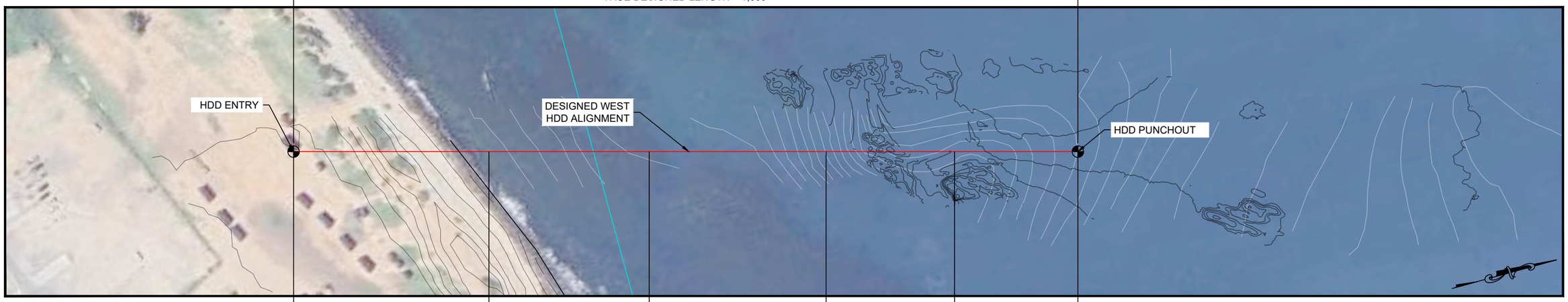


KAUA'I HDD PLAN AND PROFILE
PRELIMINARY DESIGN

GENERAL LEGEND
- HDD ENTRY POINT/ HDD PUNCHOUT
- HDD BORE PATH

PROFILE
40
20
0
400
200
100
0

NOT FOR CONSTRUCTION



PLAN

HDD ENTRY POINT @ 10°
0+00.00, 8.00
N 205113.15, E 1704693.97

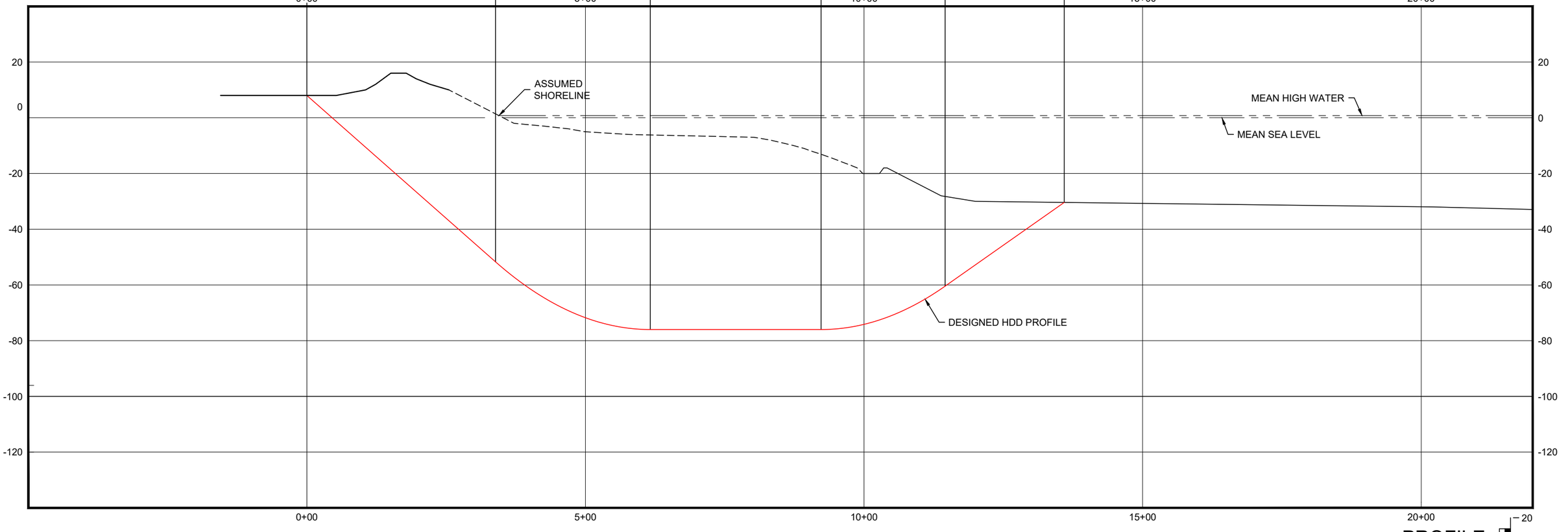
P.C. 10° SAG BEND
3+38.53, -51.69
RADIUS = 1,600'

P.T. 10° SAG BEND
6+16.37, -76.00

P.C. 8° SAG BEND
9+22.83, -76.00
RADIUS = 1,600'

P.T. 8° SAG BEND
11+45.50, -60.43

HDD PUNCHOUT @ 8°
13+59.25, -30.39
N 206424.23, E 1705052.63

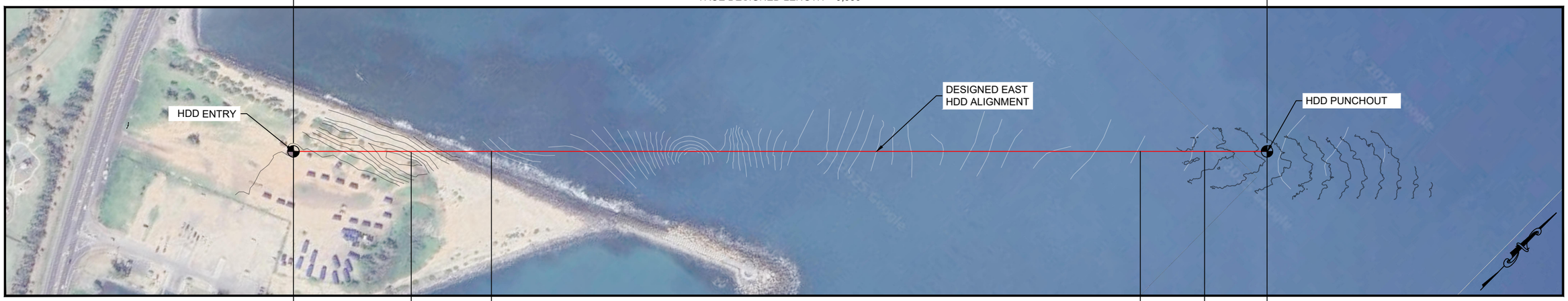


MAUI WEST HDD PLAN AND PROFILE
PRELIMINARY DESIGN

GENERAL LEGEND
- HDD ENTRY POINT/ HDD PUNCHOUT
- HDD BORE PATH

PROFILE
20
10
0
200 100 50 0

NOT FOR CONSTRUCTION



PLAN

HDD ENTRY POINT @ 10°
0+00.00, 8.00
N 205122.80, E 1704677.53

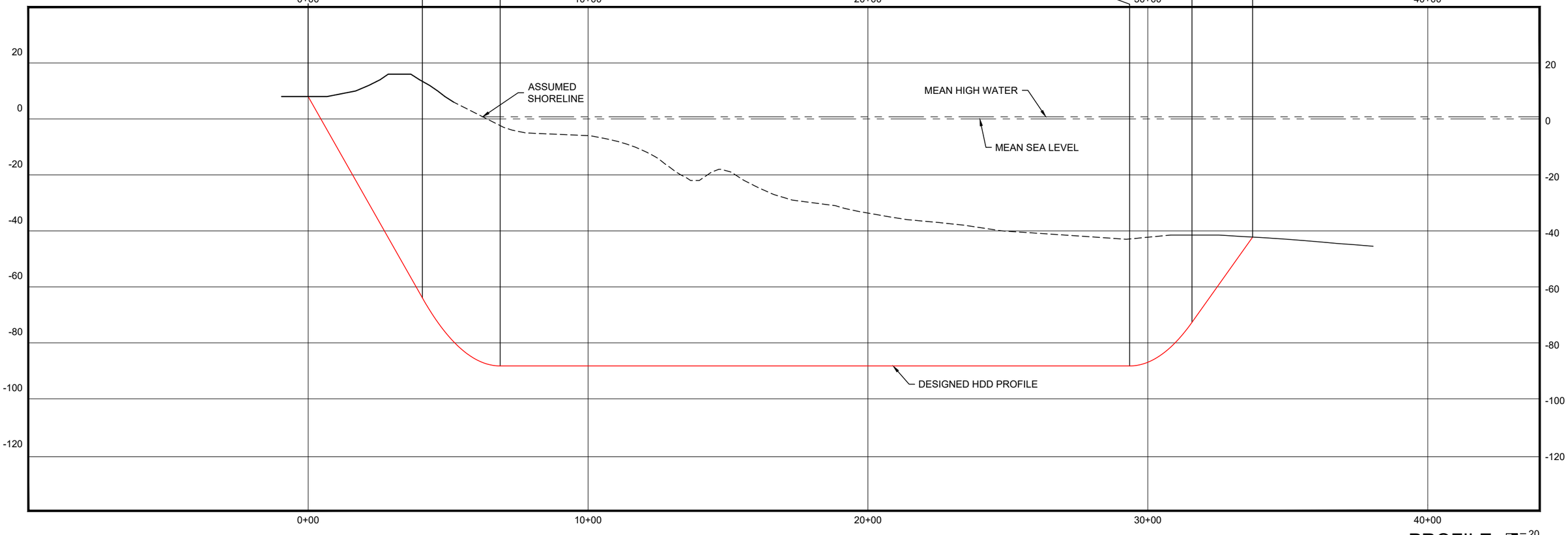
P.C. 10° SAG BEND
4+08.01, -63.94
RADIUS = 1,600'

P.T. 10° SAG BEND
6+85.84, -88.25

P.C. 8° SAG BEND
29+34.95, -88.25
RADIUS = 1,600'

P.T. 8° SAG BEND
31+57.63, -72.68

HDD PUNCHOUT @ 8°
33+74.33, -42.22
N 207486.83, E 1707085.32

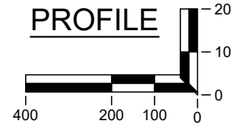


MAUI EAST HDD PLAN AND PROFILE
PRELIMINARY DESIGN

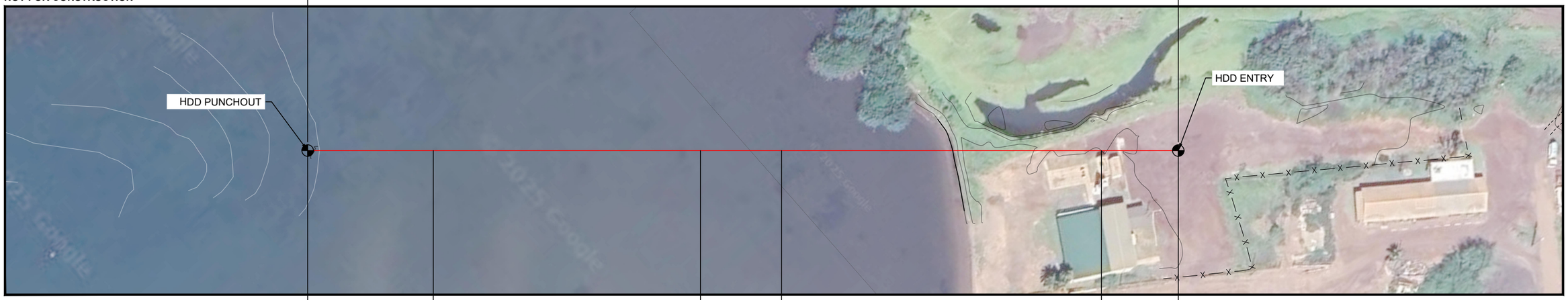
GENERAL LEGEND

- HDD ENTRY POINT/ HDD PUNCHOUT
- HDD BORE PATH

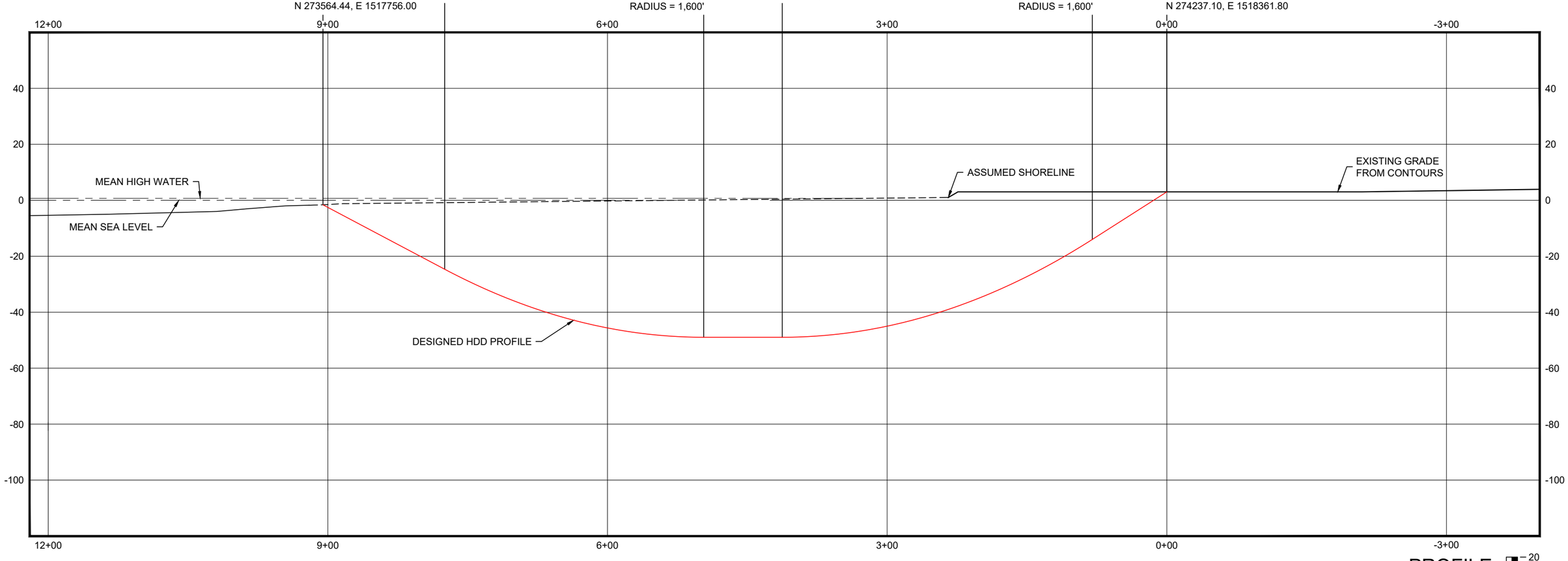
PROFILE



NOT FOR CONSTRUCTION



PLAN
SCALE: 1" = 60'

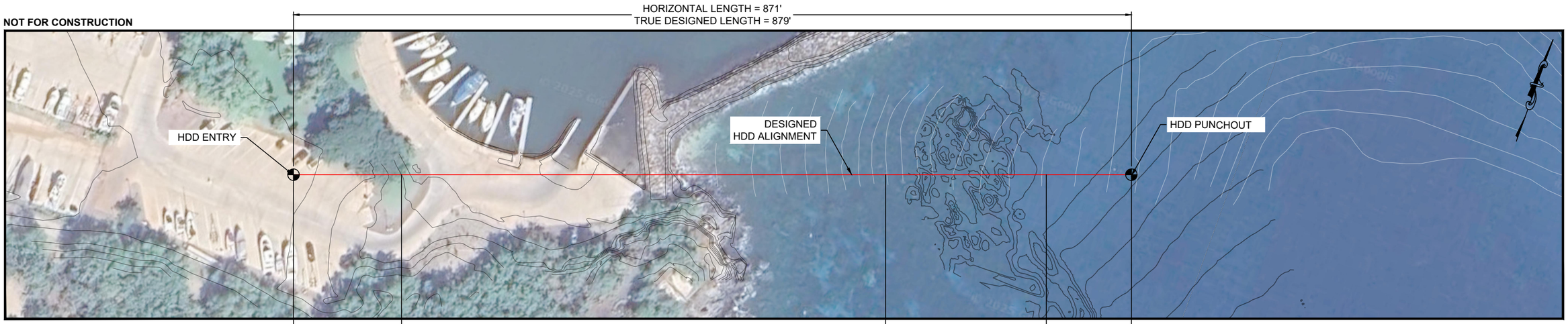


MOLOKAI HDD PLAN AND PROFILE
PRELIMINARY DESIGN

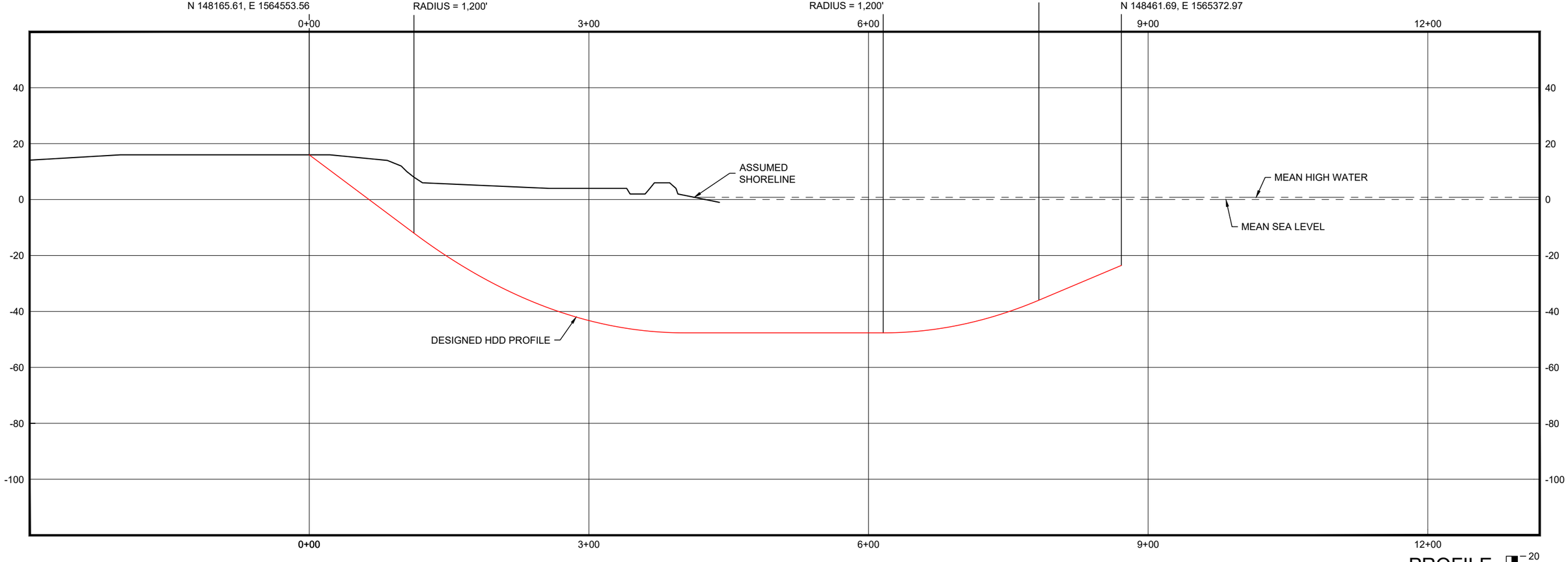
GENERAL LEGEND
- HDD ENTRY POINT/ HDD PUNCHOUT
- HDD BORE PATH

PROFILE
20
10
0
120
60
30
0

NOT FOR CONSTRUCTION



PLAN



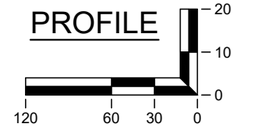
LANA'I HDD PLAN AND PROFILE
PRELIMINARY DESIGN

GENERAL LEGEND

HDD ENTRY POINT/ HDD PUNCHOUT

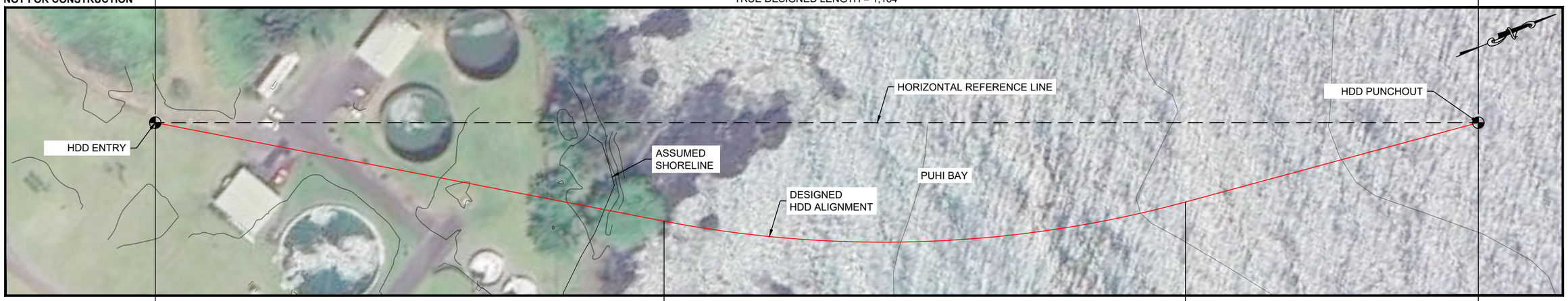
HDD BORE PATH

PROFILE



NOT FOR CONSTRUCTION

HORIZONTAL REFERENCE LENGTH = 1,147'
TRUE DESIGNED LENGTH = 1,184'



PLAN

SCALE: 1" = 50'

HDD ENTRY POINT @ 12°
0+00.00, 11.76, 0.00 RT.
N 326215.52, E 1795719.50

P.C. 12° SAG BEND
4+19.77, -79.12, 81.32 RT.
RADIUS = 1,360'

P.C. 26.14° SIDE BEND
4+37.91, -82.92, 84.83 RT.
RADIUS = 1,020'

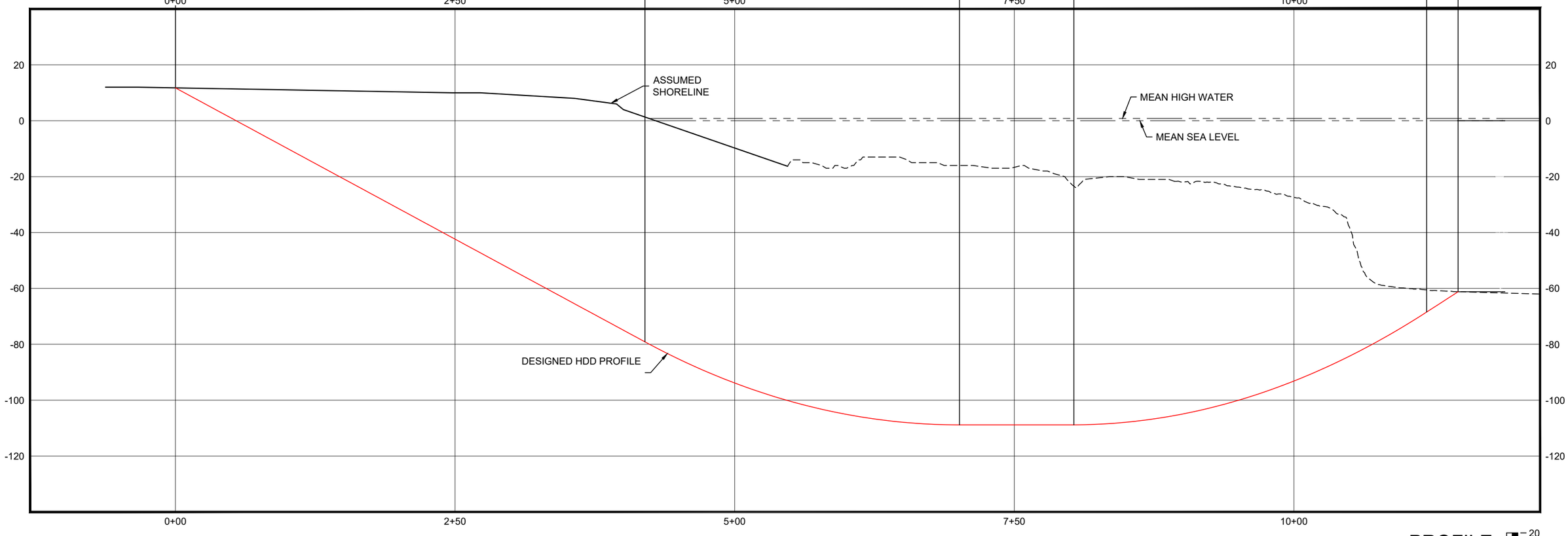
P.T. 12° SAG BEND
7+00.96, -108.84, 100.78 RT.

P.C. 14° SAG BEND
8+00.04, -108.84, 89.00 RT.
RADIUS = 1,360'

P.T. 26.14° SIDE BEND
8+97.08, -105.21, 67.71 RT.

P.T. 14° SAG BEND
11+18.70, -68.44, 7.62 RT.

HDD PUNCHOUT @ 14°
11+46.79, -61.19, 0.00 RT.
N 327269.56, E 1796171.30

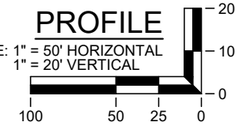


HAWAIʻI ISLAND HDD PLAN AND PROFILE
PRELIMINARY DESIGN

GENERAL LEGEND
- HDD ENTRY POINT/ HDD PUNCHOUT
- HDD BORE PATH

PROFILE

SCALE: 1" = 50' HORIZONTAL
1" = 20' VERTICAL



APPENDIX D
INADVERTENT DRILLING FLUID RELEASE CONTINGENCY PLAN

Surface Spill & Inadvertent Drilling Fluid Return Contingency Plan

Project Name: **Hawaiian Islands Fiber Link Project (HIFL)**

Prepared By: **Michels Trenchless, Inc.**

Revision No: **B (9/03/2024)**

Table of Contents

Objective **1**

Drilling Fluid **1**

Drilling Fluid Composition 2

Drilling Fluid Preparation and Use 2

Surface Spills and Inadvertent Release **3**

Drilling Fluid Surface Spills 3

Surface Spill Mitigation and Response 3

Drilling Fluid Inadvertent Return 4

Pumping Rate Monitoring 4

Inadvertent Return Response 4

Best Management Practices **6**

Communication Plan **7**

Objective

Michels Trenchless, Inc. (Michels) has prepared the following surface spill and inadvertent drilling fluid return (IR) contingency plan for the Hawaiian Islands Fiber Link (HIFL) Submarine Fiber Optic Cable System Project.

This plan summarizes the essential role drilling fluid plays in horizontal directional drilling (HDD) installs, identifies the potential for surface spills and IRs during HDD construction, summarizes the best practices for monitoring, mitigation, and prevention of surface spills and inadvertent returns, and provides details on containment and cleanup under the circumstances that a surface spill or IR does occur.

Drilling Fluid

The selection and proper utilization of drilling fluid, historically referred to as “drilling mud” in the trenchless construction industry, is essential for a successful HDD installation. Drilling fluid provides notable purposes while remaining environmentally safe in the event a surface spill or an inadvertent return is realized. Some of these functions are:

- Suspending drill cuttings and transporting them to recycling equipment located at the surface.
- Providing hydrostatic fluid pressure within the borehole to balance downhole formation pressures.
- Aiding the stabilization and sealing of the surrounding formations by supplying a cohesive nature and minimizing fluid loss from the borehole.
- Providing lubrication to the drill string and downhole assembly, thereby reducing frictional forces.
- Providing cooling for the drill string and downhole tooling.

Drilling Fluid Composition

Drilling fluid composition typically consists of water and bentonite.

Bentonite is:

- Naturally occurring clay that absorbs free water into its structure
- Non-toxic, inert, and meets NSF/ANSI-60 Drinking Water standards.
- Widely used in the trenchless installation industry and for drilling potable water wells.

Beyond drilling, bentonite is also used in agriculture:

- Improving soil structure by increasing water retention and aeration.
- Enhancing nutrient availability by reducing leaching and helping retain essential minerals.
- Supporting plant health in sandy or degraded soils by improving moisture-holding capacity.

This dual-purpose material makes bentonite a sustainable and versatile choice for both industrial and environmental applications.

The selection of which brand to use is typically based on price and availability at the time of the project. All brands have similar characteristics, providing the same results as listed above.

Additional additives to the drilling fluid can be introduced to aid in overall performance but are not anticipated for use on this project. If deemed beneficial and necessary, Material Safety Data Sheets (MSDS) will be submitted for acceptance before use.

Drilling Fluid Preparation and Use

To prepare drilling fluid for an HDD installation, bentonite powder is mixed in the mud processing system's containment tank at the recommended ratio per manufacturer to create a mud composition that will suit the project's specific needs. Mixing ratios depend on ground conditions anticipated during the drilling process.

Once the drilling fluid is mixed to the right consistency, it is pumped from the containment tank to the back end of the HDD drill rig. Then, it flows through the drill pipe to the drill head, where it mixes with the excavated material. This mixture flows back through the annular space between the drill stem and the formation wall to the HDD Returns Pit, also called the “Entry Pit.” From there, a submersible pump moves the drilling fluid and cuttings to the mud processing system, which separates the fluid from the excavated material so it can be reused in the HDD drilling process.

Surface Spills and Inadvertent Release

The following section discusses the potential for both surface spills and inadvertent release of drilling fluid during HDD operations.

Drilling Fluid Surface Spills

During construction, the potential for surface spills of drilling fluid is minimal but can occur regardless of training and implementation of best management practices. During HDD operations, the identified sources that pose a risk for a surface spill event are the following:

1. Excavated pits that collect the drilling fluid as it returns from the borehole during drilling.
2. Hoses, fittings, and pump malfunctions and leaks.
3. Overflow of containment tanks (Baker tanks) or leaks at connection points
4. Vac trucks, Dump Trucks, accidentally release, mechanical failure or leaks.

Surface Spill Mitigation and Response

Area of Potential Spill	Mitigation	Spill Response
Mud Containment Pits "Entry Pit": *Potential Overflow* - Located at excavated entry	**Drill Operator**: Closely monitor fluid returns in the drill entry pit in view of the drill survey trailer to maintain appropriate levels.	Contain Area. If fluid level becomes high, run pump continuously in pit until safe level is achieved. Add multiple pumps if required.
Hoses: *Possible Leaks* - At the connection between tanks & sump pumps.	**Mud Technician**: Inspects hose connections every day for leaks & wear, maintains a full stock of replacement parts in the supply trailer.	Contain Area. Repair leaks and replace worn-out hoses and parts.
Containment Tanks: *Potential Overflow or Leak* - Soil separation, cutting containment and solids control tanks. **Containment Tanks are located on the Mud Processing system"	**Mud Technician:** Continuously observes & controls fluid levels & flow from a birds-eye view located on top deck of mud mixing/soil separation rig.	Contain Area. If solid control tanks reach overflow point, pump down to manageable level. May have to pump excess fluid/cuttings to vac truck or other storage tank. Maintain exterior valves.
Baker Tanks: *Potential Overflow or Leak* - At temporary holding tank for drill cuttings and fluids. At exterior valve location	**Mud Technician:** Continuously observe levels and flow from a birds-eye view located on top deck of mud mixing/soil separation rig.	Contain Area. If solid control tanks reach overflow point, pump down to manageable level. May have to pump excess fluid/cuttings to vac truck or other storage tank. Maintain exterior valves.
Vac Trucks/Dump Trucks: *Possible Leak or Release-* At valve location or worn hose.	**Vac Truck Driver:** Maintain equipment in proper working order and follow specific guidelines in operation of vacuum and valves.	Contain Area. If solid control tanks reach overflow point, pump down to manageable level. May have to pump excess fluid/cuttings to vac truck

Drilling Fluid Inadvertent Return

An Inadvertent Return is where drilling fluid is released through fractured subsurface soil and travels toward the surface during HDD Operations. This can happen when there is an absence of an open borehole conduit or the presence of a geological formation fracture that leads to partial or potentially total loss of drilling fluid circulation.

While it is impossible to determine when and if an IR will occur, it is possible to monitor to mitigate potential IRs and/or respond swiftly to prevent major releases.

Pumping Rate Monitoring

During drilling operations, the drill operator will be continuously monitoring for fluid loss by watching for a difference between the rates at which the fluid is being pumped downhole and the rate at which it returns to the entry pit. This continuous monitoring allows for early detection of fluid loss, helping to limit the quantity lost and ensuring any impacts to remain minimal and highly localized.

If Potential loss of fluid or circulation is noticed, the following response will occur:

1. Temporarily cease drilling operations, including pump shutdown.
2. Dispatch trained observers as required to monitor the area in the vicinity of the HDD alignment for inadvertent returns of drilling fluid at the surface.
3. Identify the position of the drill head in relation to the point of entry
4. Re-start the pump and stroke the borehole up and down in stroke lengths up to 30 feet up to 6 times, but no fewer than 2 in an effort to size the bore-hole annulus and re-open the circulation pathway. (Based on the driller's discretion, it may be useful to increase the stroke length to 90 feet or past the point where the operator believes circulation was lost).
5. A trained observer will continuously monitor for inadvertent fluid returns as long as the pump remains on during the process of re-establishing circulation.

If circulation is re-established, drilling will proceed as usual, and monitoring for inadvertent fluid will take place once again if the rate of drilling returns progressively decreases at the fluid entry pit. If circulation is not re-established, monitoring for inadvertent fluid returns to the ground surface will continue, and drilling will proceed.

Inadvertent Return Response

Scenario One*:* If an inadvertent return occurs and the amount of release is not great enough to allow practical collection, the affected area will be diluted with fresh water and allowed to dry and dissipate naturally back into the earth.

Scenario Two: If an inadvertent return occurs, and the amount of release is greater than what can be suitably contained with hand-placed containment barriers, a small collection sump (less than 3.8 cubic meters) will be used to pump fluid back to the solids control system.

Scenario Three: If an inadvertent return occurs and drilling fluid returns are observed to be continuously surfacing above ground at an accessible location the following procedure will be followed:

1. Immediately cease pumping of drilling fluid.
2. Contain the location such that the drilling fluid cannot migrate across the ground surface.

Materials and equipment used for containment:

- Straw Bales;
- Silt Fencing;
- Check Dams;
- Backhoe for Accessible Areas;
- Shovels;
- Portable Pumps;
- 100 feet of Hose.

3. Excavate a small sump pit at the location and provide a means for the fluid to be returned to either the drilling operations or a disposal site (i.e., pump through hose or into tanker);

4. Notify the identified on-site contractor supervisor and Owner representative as required by the site-specific communication plan;

5. Continue drilling operations after company/company representative approval and maintain the integrity of the containment measures and monitor the fluid returns as required to ensure that no surface migration occurs.

6. Clean-up is carried out once inadvertent returns are contained/controlled;
    - Fluid pumped to a secure containment vessel;
    - Area is diluted with water;
    - Area is restored to original condition.

Scenario Four: If an inadvertent return occurs offshore

1. Pause drilling operations immediately upon identifying an IR.

7. Notify the identified on-site contractor supervisor and Owner representative as required by the communication plan;

2. Evaluate recovery options:
    - If the release is accessible from shore, use a vacuum truck to recover fluids.
    - If offshore and unreachable, removal/cleanup is impractical due to wave action and rapid dispersion.

3. Once the release has dissipated, take follow-up photographs to confirm site stabilization.

4. Adjust drilling fluid properties to reduce mobility and minimize further migration.

5. Trip out the drill string to wipe the borehole annulus and relieve pressure.

6. Assess the use of Lost Circulation Material (LCM) to seal the fracture and stabilize the formation.

7. Allow the formation to rest, then resume drilling with close monitoring.

8. Forward ream the borehole up to the IR location to relieve annular pressure, if needed.

Continue drilling with minimal fluid, gradually increasing volume while observing for any recurrence.

Best Management Practices

Geotechnical Review: Understanding the anticipated ground conditions for an HDD installation helps minimize the risk of an inadvertent return. Michels personnel spend time reviewing given geotechnical data and their industry experience to identify areas of concern prior to the commencement of drilling.

Spill Response and Inadvertent Return Response Training: Spill response training will be conducted for all site personnel; Michels personnel are required to undergo pre-construction training to discuss preemptive measures and early response procedures and techniques specific to the project. This training introduces Michels personnel to the appropriate chain of communication leading up to suspending of drilling operations should that action become necessary.

The following topics will be addressed during the training session:

- Preventative Methods to Invoke Prior to and During Construction;
- Details of the Surface Spill Plan & Inadvertent Drilling Fluid Return Contingency Plan;
- Environmental Protection; Understanding of Site Specific Areas
- Mitigative Resources Available at the site for Environmental Protection;
- Site Specific Permit Conditions;
- Monitoring of HDD operations (Recognize the Potential Areas of Inadvertent Release/Spill);
- Chain of Authority and Responsibility;
- Chain of Communication;
- List of Contact names and phone numbers of governing agencies to be posted;
- Incidents that must be reported and the person to report them to.

Daily Visual Inspection: Michels personnel and our subcontractors will be trained and required to visually inspect all equipment daily before use and periodically during operations to ensure proper function.

Erosion and Sediment Control: Michels will have erosion and sediment control installed to protect surface spills from reaching sensitive areas within the project vicinity which will be indicated in the project drawings. All installed controls will be visually inspected daily and maintained throughout the project.

Readily Available Response Materials and Equipment: When it comes to managing and controlling surface spills and inadvertent release that do occur during construction, early detection, and prompt response are crucial. To aid in quick response to surface spills on site, Michels will have the proper supplies and equipment readily available to contain and control and clean up surface spills on site.

Equipment/ Supply List:

- Track Excavators
- Leak-free portable pumps
- Sandbags
- Plastic Sheeting
- 55 Gal. drums with bottoms cut out
- Spill Kits

- Leak-free hoses
- Filter Sock
- Silt Fence
- Vacuum Truck

Site Monitoring: During construction, Michels will conduct “IR Walks” along the HDD alignment at a minimum of 2 times per shift.

Washover Casing Use: Michels will install washover casing to mitigate the risk of inadvertent returns while drilling near the entry points. The length of washover casing to be used will be determined by Michels’ experienced field personnel, depending on the conditions encountered during the pilot hole and observation of drilling fluid return volumes and contents. Upon the need for washover casing be determined to be required (as determined by Michels), the following steps will be implemented:

1. Drilling of the pilot hole begins.
2. Casing will be placed and pushed over the drill pipe behind the downhole tooling.
3. Continue drilling the pilot hole and adding sections of washover casing until it is not required (as determined by Michels).
4. Continue drilling the pilot hole until it is complete.
5. Extract washover casing pipe

Seabed Exit Strategy: Before reaching the exit point on the seabed, based on the seabed’s geology, the use of standard drilling mud will stop to mitigate the release of drilling fluid at the punch-out location. The final part of the borehole will be drilled using either fresh water or a biodegradable, solids-free fluid.

Communication Plan

Prior to the start of construction at each specific location, a communication plan will be developed to address surface spills and IR notification and reporting. Each plan will include the following details:

1. Contact information for site-specific project personnel, as well as agencies and landowners, to be included in correspondence.
2. Notification/correspondence conditions for surface spills and IRs
3. Documentation and reporting Protocol
4. Chain of command for notification and correspondence.

APPENDIX E
DECOMMISSIONING PLAN

Hawaiian Islands Fiber Link (HIFL) Decommissioning Plan

Background

In recent years, high-speed broadband has become critical infrastructure for various functions including business and economic development, educational advancement, healthcare, social and civic engagement, government and public services, and national security. Fiber optic cable systems, which use lasers to transmit data signals through protective fiber optic strands, provide significantly higher total bandwidth than other technologies and are currently the most reliable and practical method for high-speed transmission and distribution of broadband.

Currently, subsea cable infrastructure accounts for approximately 99 percent of global data traffic carried between continents, which is crucial to the Internet. This infrastructure supports communications for consumers, businesses, and government agencies, including military, diplomatic, and national security entities. Cables typically operate for as long as possible, then are retired due to economic obsolescence, driven by factors such as the development of newer technologies, or shifts in market demand.

In Hawai‘i, most of the broadband connectivity, both interisland and between the State and the continental United States, relies on submarine fiber optic cable systems. These systems form the backbone of Hawaii’s digital infrastructure and are essential to meeting current and future demands for connectivity.

Project Purpose

The Hawaiian Islands Fiber Link (HIFL) Project aims to develop an interisland fiber optic cable system, providing robust and reliable broadband access and availability throughout the State of Hawai‘i. Specifically, it involves the construction, operation, and maintenance of an interisland fiber optic cable network that will distribute high-speed broadband to the six main Hawaiian Islands, with associated cable landing sites on Kaua‘i, O‘ahu, Maui, Lāna‘i, Molokai, and Hawai‘i Island.

The Project directly supports the state’s *Connect Kākou* broadband initiative, which prioritizes infrastructural investments to ensure equitable access to high-quality and robust broadband service statewide.

Project Description

The HIFL Project will encompass both marine and terrestrial components. Approximately 416 miles of submarine fiber optic cable will be laid on the surface on the seafloor between the islands. The cable will have a diameter ranging from approximately 17mm to 28mm. It will be installed in five segments covering the nearshore state waters and the surrounding U.S. federal waters. The deepest water depth of the cable route will be approximately 15,750 feet. No burial activity will be carried out for the entirety of the marine cable route.

At all six cable landing sites, horizontal directional drilling (HDD) will be utilized to install conduits that facilitate the installation of cables beneath the shoreline to an offshore punchout point in nearshore waters. The terrestrial components at each cable landing site will include a beach manhole (BMH), terrestrial fiber optic cable (terrestrial cable), and a cable landing station (CLS). The BMH will be a below-ground reinforced concrete vault (or similar) where the subsea cable terminates. The terrestrial cable will connect with the subsea cable in the BMH and extend to the CLS. The terrestrial route will consist of underground conduits and/or existing utility infrastructure.

The HIFL system would be owned and operated by a public-private partnership comprised of Ocean Networks, Inc. (ONI), a private company specializing in the development and maintenance of submarine cables, and the University of Hawai'i System Office for Information Technology, with support from the Research Corporation of the University of Hawai'i. Once installed, the HIFL system is expected to have a commercial life cycle of approximately 25-30 years. ONI will be responsible for system maintenance throughout the operating period, with decommissioning or repurposing of the infrastructure at the end of its service life.

HIFL Cable Landing Sites

Nukoli'i Beach, Hanamā'ulu Ahupua'a, Līhu'e District, Kaua'i Island
Single HDD conduit with cable segment connecting to Barbers Point Beach Park, Oahu.

Barbers Point Beach Park, Honouliuli Ahupua'a, 'Ewa Moku, O'ahu Island
Two (2) HDD conduits, with one cable segment connecting to Nukoli'i, Kauai, and the other segment connecting to Kahului, Maui.

Kahului Harbor, Wailuku Ahupua'a, Wailuku Moku, Maui Island
Two (2) HDD conduits, with one cable segment connecting Barbers Point Beach Park, Oahu to the branching unit to Manele Harbor, Lanai, and the other segment connecting to Hilo, Hawaii Island.

Kaunakakai Harbor, Kaunakakai Ahupua'a, Kona Moku, Molokai Island
Single HDD conduit, with a cable segment branching to connect to the Oahu-Maui segment.

Mānele Harbor, Pālāwai Ahupua'a, Lāhaina District, Lāna'i Island
Single HDD conduit, with a cable segment branching to connect to the Oahu-Maui segment.

Pacific Aquaculture & Coastal Resource Center (PACRC), Hilo, Waiākea Ahupua'a, South Hilo District, Hawai'i Island
A single HDD conduit, with a cable segment connecting to Kahului Harbor, Maui.

Decommissioning Plan

The anticipated design life of the HIFL Project is 25 to 30 years. The intent is to operate the cable for as long as possible under its designed purpose, especially in the Hawaiian Islands,

where the economics do not lend to new cables being built to match historical norms. At the end of design life, subsea cable systems can be re-purposed to fulfill other needs without the need for commercial data transmission (e.g., scientific research, climate and ocean observations, maritime security monitoring, etc.). To this end, the HIFL system is intended to operate for as long as it continues to have value. As the system reaches the end of its design life, the infrastructure will be evaluated to determine the next best steps for the asset.

Decision Process for Evaluating Commercial Viability

Assessing the commercial viability of a submarine cable project requires a thorough financial analysis that considers various factors throughout the system's lifecycle. During the system's operational phase, a reserve fund will be established to cover potential costs related to the recovery of any decommissioned cable segments, as mandated. The following factors should be reviewed annually after the design life of the cable system is reached to evaluate its ongoing designed viability. Below are considerations that need to be assessed yearly when determining the cable system's viability.

- Lifecycle & Technological Risks:
    - Technology Obsolescence: Advances in cable or networking technology could reduce system relevance.
    - Scalability: Ability to upgrade capacity economically over time.
    - Cybersecurity & Operational Risks: Cost associated with protecting the infrastructure from cyber threats or operational disruptions.
- External Economic Factors:
    - Inflation Risks: Impacts of materials, labor, and equipment.
    - Financing Costs: Interest, debt servicing, or equity investment.
    - Market Volatility: Changes in broadband demand, pricing, and competition.

Decision Process for Evaluating System Repurposing

After thorough evaluation, several options for repurposing the asset may be available, as follows:

1) **Fiber Optic Sensing (FOS) for Scientific Research**

The most innovative and strategically valuable end-of-life (EOL) pathway for deep-water cable segments is repurposing them to permanent sensing systems, often referred to as Submarine Cable Observation Systems or Science Monitoring and Reliable Telecommunications, also referred to as "SMART" cables, without the need for commercial data transmission.

Out-of-service fiber-optic telecommunications cables can be transformed into vast ocean sensing arrays through FOS technologies. This approach utilizes unmodified dark fibers within the cable structure to detect and measure external environmental phenomena.

This conversion establishes a permanent cabled observatory system, addressing the critical scarcity of sustained ocean observation networks, particularly near the seafloor. The repurposed assets enable the continuous monitoring of Essential Ocean Variables, including seafloor pressure, temperature, and seismic activity. For example, the capability to detect the timing and nature of natural processes, such as earthquakes and tsunamis, provides significant public safety and climate monitoring value.

The cable system (or segments of) could then be transferred to a scientific research entity, whose responsibility would be for indefinite operation, maintenance, and future disposition of the system. In this case, the system could be donated to the University of Hawaii or another academic institution for scientific research activities.

A study of the cable route could identify areas of interest that are crucial for supporting climate and ocean observations, sea-level monitoring, earth structure observations, tsunami and earthquake early warnings, and disaster risk reduction. Hawaiian Island Fiber Link LLC would transfer ownership of the cable system (or segments of) for ocean observation to the entity managing the scientific research. The unused segments of the cable could be left in situ or recovered.

2) **Maritime Security and Critical Infrastructure Protection**

In an era defined by increasing geopolitical competition, subsea cables are recognized as vital national security infrastructure. Repurposing out of service cables using FOS offers a clandestine, cost-effective layer of continuous maritime security monitoring that active commercial cables cannot provide.

The acoustic and magnetic sensing capabilities embedded or coupled with the cable can detect specific underwater threats across thousands of miles. These monitored threats can include fishing trawls, anchors, remotely operated vehicles, autonomous underwater vehicles, and submarines. By converting OOS assets into security platforms, the owner contributes to national resilience and protects critical infrastructure, thereby realizing substantial strategic value from the abandoned assets.

The highest strategic value for a long-distance OOS cable is achieved through its conversion into an FOS platform for security and science. This repurposing is only practical if the cable is abandoned in place. To unlock this value, HIFL LLC would need to negotiate a liability transfer agreement with a relevant government agency or academic consortium. The government would gain a long-term, high-value security/scientific platform without incurring installation costs. The owner transfers the perpetual liability inherent in abandonment, satisfying the objective to maximize both economic utility (transferring risk) and repurposing potential.

Hawaiian Islands Fiber Link

Dismantling of Cable System Equipment

If the HIFL system is determined to be no longer financially viable, and the cable, some cable segments, or parts of cable segments cannot be repurposed, the unwanted cable segments would be dismantled, as appropriate.

The removal of cables may have unintended environmental consequences, such as seafloor disturbance and benthic recovery. Therefore, there is a pressing need to understand the environmental impacts associated with both leaving cables in place and removing them, considering each cable system's segment footprint. The cable recovery operations must be conducted with careful consideration of the marine environment, including potential impacts on habitats and aquatic life. Leaving cables in situ after use will likely have no detrimental ecological effect. In soft seafloor sediments, unburied cables may host new communities, such as sea anemones, as they create a reef effect. The primary environmental consideration at EOL involves a fundamental trade-off: mitigating the short-term, acute habitat disruption caused by removal versus accepting the long-term, passive presence of the inert abandoned asset.

Modern fiber cores are highly chemically stable and resistant to seawater corrosion (Richardson et al. 2022, Yamaguchi et al, 2023). Once settled on the seafloor, their presence generates minimal long-term effects on biodiversity. Conversely, the active process of cable recovery, especially in sensitive or shallow habitats, involves significant vessel mobilization, sediment disturbance, and can lead to increased turbidity and localized habitat destruction. Regulatory assessments, including the Convention for the Protection of the Marine Environment of the North-East Atlantic, have concluded that cable removal often generates a greater short-term ecological risk than leaving the inert asset undisturbed (Aziz & Zhang 2023, OSPAR Commission 2024).

Once a decision is made that a cable segment needs to be recovered, a cable recovery plan is accepted by the relevant authorities, and proper notifications are provided to stakeholders, the removal process can commence. This process involves disconnecting, recovering, and often recycling or repurposing the cables.

For deep-sea segments where abandonment is permitted, the resulting ecological impact is often neutral or even positive. In soft sediment environments, OOS cables provide a stable, firm substrate that is otherwise scarce. This substrate facilitates colonization by encrusting organisms, leading to an “artificial reef effect.” Examples include the colonization of cables by anemones off California and robust biological mantles forming on articulated pipe protection in locations such as Bass Strait. Historically, organisms recovered from deep-sea cables have significantly advanced knowledge of deep ocean biota.

Furthermore, analyses in areas such as Okinawa have noted a secondary positive outcome, known as the “reserve effect,” where restrictions on fishing and anchoring activity near the cable infrastructure unintentionally create sanctuary zones, benefiting local marine life. When considering the chemically inert nature of the cable, the acute environmental damage caused

by recovery, and the passive ecological benefits of abandonment, for deep-sea segments where burial is technically impossible (water depths nominally greater than 4,000 feet) and regulatory mandates are minimal, the optimal environmental strategy is “Abandonment for Repurposing/Stewardship”. This decision maximizes ecosystem support and minimizes environmental disturbance.

Expert recovery companies like Oceanic Environmental Cables and Mertek Marine both buy out-of-service cables as well as acquire entire cable systems, taking over all associated risks and liabilities from the original owner. This mechanism would allow the HIFL owner to transfer the regulatory and marine operational risks inherent in the disposal process to an expert entity. This transfer of risk liability to a recovery company effectively maximizes the cost recovery of the installation and operations of cable for the original owner.

The Project includes both wet plant components (such as undersea cables and two branching units), beach maintenance holes, and HDD ducts, as well as dry plant components (land-based terminal transmission equipment located in the CLS). Cable segments that cannot be repurposed will be recovered from the seabed if deemed necessary by the authorities, with consideration given to the ecological impacts. In summary:

- Some cable segments can be recovered, salvaged, and repurposed for use in different locations where the local economics do not justify the installation of new cable systems. This process offers a crucial advantage over new builds: it is significantly quicker and often less expensive
- BMHs and HDD ducts can be repurposed for use with a potential new incoming cable system and free up cable corridors.
- The CLS, for the most part, already existing structures in the university campuses, and the removal of the transmission equipment within the room would free up floor space. As for the module, new construction cable stations can be repurposed for any needs deemed by the university upon the removal of the transmission equipment.
- Subsea cables represent a significant repository of recyclable materials. Even modern fiber-optic cables contain substantial quantities of steel armoring, aluminum, and high-density polyethylene (HDPE) plastics, in addition to any residual copper or other metals. A specialized company will recover the cable from the seabed, and the recovered cable will then be transported out of the U.S. to a specialized recycling facility.
- The two recovered branching units will also be transported to the specialized recycling facility. Containing different components than the main line, the components of the branching units are optical routing devices within pressure-resistant housing requiring specialized processing for recycling.

Hawaiian Islands Fiber Link

References

Aziz, A., & Zhang, C. 2023. *Environmental Impacts From Decommissioning of Subsea Pipelines (Attachment to CER IR 1.14 – Final)*. Canada Energy Regulator

OSPAR Commission. 2024. *Guidance on the application of OSPAR Decision 98/3: Disposal of Disused Offshore Installations (OSPAR Agreement 2024-04)*

Richardson, G., Shaw, J., and Wells, K. 2022. *Breaking the Cycle of Submarine Cable Failures*. Scientific Management International Ltd.

Yamaguchi, H., Kawaguchi, Y., and Hirano, M. 2023. *Optical Fibers for High-Fiber-Count Submarine Cable Systems*. Sumitomo Electric Technical Review, E96-07

APPENDIX F
MARINE BIOTA SURVEY REPORTS

MARINE RESEARCH CONSULTANTS, INC.

Marine Biota Survey – Hawaiian Island Fiber Link Project Nukoli‘i, Kaua‘i, Hawai‘i



SUBMITTED TO:
Ocean Networks, INC (ONI)
And Tetra Tech

PREPARED BY:
Marine Research Consultants, Inc.
46-312C Haiku Rd
Kaneohe, HI 96744
808-779-4009

DATE: August 14, 2025

TABLE OF CONTENTS

1 INTRODUCTION 1

2 METHODS 1

3 RESULTS 6

3.1 ORIGINAL (SHALLOW) PUNCHOUT POINT 6

3.1.1 Percent Cover 6

3.1.2 Coral 6

3.1.3 Non-Coral Invertebrates 6

3.1.4 Fish 7

3.2 RELOCATED (DEEP) PUNCHOUT POINT 7

3.2.1 Coral 7

3.2.2 Non-Coral Invertebrates 8

3.2.3 Fish 8

4 SUMMARY and DISCUSSION 11

List of Figures

Figure 1 Aerial Photograph of Marine Area Offshore of Nukoli'i Showing the HIFL Punchout Point and Proposed Cable Route 4

Figure 2 Map Showing Original Punchout Point, Relocated (Deep) Punchout Point, Cable Route, Orthomosaic Locations, and Qualitative Survey Area 5

Figure 3 Seafloor Adjacent to the Original Nukoli'i Punchout Point (depth ~20 m) . 12

Figure 4 North Orthomosaic (OM-N) (North Up) 13

Figure 5 South Orthomosaic (OM-S) (North Up) 14

Figure 6 Corals Observed in the Immediate Vicinity of the Original (Shallow) Punchout Point 15

Figure 7 Lei triggerfish (*Sufflamen bursa*) Sheltering in a Hole in the Reef Surface in the Vicinity of the Original (Shallow) Punchout Point (Depth ~20 m) 16

Figure 8 *Dascyllus albisella* (Hawaiian dascyllus) and *Paracirrhites arcatus* (arceye hawkfish) Sheltering in *Pocillopora grandis* (antler coral) in the Vicinity of the Original (Shallow) Punchout Point (Depth ~20 m) 16

Figure 9 Shelf Break Seaward of the Original (Shallow) Punchout Point and Shoreward of the Revised (Deep) Punchout Point (Depth ~21 m) 17

Figure 10 Undercut Notch on Vertical Cliff along West Edge of the Deep Site Colonized by *Antipathes griggi* (Hawaiian black coral, largest colonies ~ 1 m in length) (Depth ~23 m) 18
Figure 11 Undercut Notch on Vertical Cliff Dropoff Colonized by *Antipathes griggi* (Hawaiian black coral, largest colonies ~ 1 m in length) (depth ~23 m) and Seafloor at Base of Cliff (Depth ~25 m). Photo located above the Deep Site. 19
Figure 12 Colonies of *Pocillopora meandrina* (cauliflower coral) and School of *Lutjanus kasmira* (bluestripe snapper) at Base of Cliff (Depth ~25 m) 19
Figure 13 Two Views of the Seafloor Offshore of the Cliff in the Vicinity of the Relocated (Deep) Punchout Point (Depth ~25 m) 20
Figure 14 Corals Observed in the Vicinity of the Proposed Deep Punchout Location 21
Figure 15 Orthomosaic of the Deep North Site (OM-DN) (North Right) 23
Figure 16 Orthomosaic of the Deep South Site (OM-DS) (North Right) 24
Figure 17 School of *Caranx ignobilis* (giant trevally or white ulua) Schooling Beneath the Undercut Ledge (Depth ~23 m) 25
Figure 18 Large School of *Lutjanus kasmira* (bluestripe snapper) on the Deep Platform (Depth ~25 m) 26
Figure 19 Undercut Ledge Providing Shelter for *Myripristis* spp. (Soldierfish) and *Lutjanus kasmira* (bluestripe snapper) (Depth ~25 m) 26

List of Tables

Table 1 Coordinates and Depths for Orthomosaics at all Proposed Punchout Locations 3
Table 2 Percent of all Benthic Cover from Orthomosaics OM-N and OM-S Adjacent to the Original Punchout (Shallow) 8
Table 3 All Species of Invertebrates and Macroalgae Observed During Marine Biota Surveys near the Original Punchout (Shallow) and Relocated Punchout (Deep) 9
Table 4 All Species of Fish Observed near the Original Punchout (Shallow) and Relocated Punchout (Deep) 10
Table 5 Number of Coral Colonies by Species and Size Class at Deep Orthomosaic Sites OM-DN and OM-DS 22

1 INTRODUCTION

The Hawaiian Islands Fiber Link (HIFL) project is a proposed interisland subsea fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the State of Hawai'i. The Project involves construction, operation, and maintenance of a subsea cable that would interconnect the six main Hawaiian Islands, with cable landing sites located on Kaua'i (Nukoli'i Beach), O'ahu (Barbers Point), Maui (Kahului Harbor), Moloka'i (Moloka'i Yacht Club), Lāna'i (Mānele Harbor), and Hawai'i Island (Pacific Aquaculture & Coastal Resource Center, Hilo). The cable, which would have a maximum diameter of approximately 1.1 inches, would be surface-laid on the seabed within state and U.S. federal waters between these sites. At all six of the cable landing sites, horizontal directional drilling (HDD) would be used to allow the cable to traverse underneath the shoreline between the onshore portion of the cable landing site and the respective offshore punchout location in the nearshore waters.

Marine Research Consultants, Inc., (MRC) was contracted to conduct marine benthic surveys at each of the six cable landing sites. This report presents the results of the in-water survey of the HDD punchout area for the Nukoli'i site, located on the eastern side of the island of Kaua'i.

2 METHODS

Marine biota surveys of the HIFL HDD punchout and adjacent areas offshore of Nukoli‘i on the island of Kaua‘i were conducted on November 22, 2024, and April 17, 2025, (Figure 1). The surveys were conducted by two marine biologists (S. Dollar and A. Millan) using SCUBA working off a small boat. A handheld Global Position System (GPS) device (Garmin GPSMap79s) was used to navigate to the coordinates of the proposed punchout locations where a weighted buoy was deployed to mark the site (Figure 2). Divers carried underwater slates and digital mirrorless cameras in underwater housings and descended the buoy line to the punchout location. Divers photographed and recorded videos of all observed coral, non-coral invertebrates, fish, and macroalgae species as well as topographic and structural features and substrate type within the vicinity of the punchout points. The search area varied by site but was generally bound by depth in the east-west direction (within ~2 m depth of the punchout point) and extended 5-10 m in the north-south direction from the edges of the quantitative survey areas. Species lists were tabulated for all biota observed in situ as well as from review of photographs and video.

Orthomosaic imagery was used to document and analyze the seafloor at and adjacent to the proposed punchout locations. An orthomosaic is an image with high detail and resolution created by combining multiple overlapping photographs. Orthomosaics are orthorectified to geometrically correct for perspective view, lens distortion, and camera angle to create an image covering a relatively large area with a uniform scale and no distortion. As a result, orthomosaics provide a valuable tool for accurate ex situ analysis of undistorted two-dimensional benthic composition.

Fieldwork conducted in November 2024 surveyed the originally proposed punchout location (shallow), which was located along the inshore edge of an undercut ledge at a water depth of ~18 meters (m) (Table 1). Two adjacent orthomosaics oriented in a north-south direction were constructed at the shallow punchout. These were designated as the North Orthomosaic (OM-N) and the South Orthomosaic (OM-S) (Figure 2). After discussing the results of these surveys with ONI, it was determined that the shallow water punchout location was not preferred due to adjacent steep bathymetry and constraints associated with multiple colonies of *Antipathes griggi* (Hawaiian black coral), as discussed further in the results section. Additional analysis of the bathymetry and surrounding areas was conducted by ONI, Tetra Tech, and MRC to identify alternative locations that were within suitable depth limits and avoided the steep bathymetry and Hawaiian black coral colonies.

Fieldwork conducted in April 2025 surveyed these proposed alternative punchouts located at the base (offshore side) of the undercut ledge at a water depth of ~25 m (deep) (Table 1). In this deeper region, two additional orthomosaics oriented in a north-south direction were constructed and designated as Deep-North (OM-DN) and Deep-South (OM-DS) (Figure 2). OM-DN encompassed the proposed deep punchout location should the initially proposed cable alignment be utilized. OM-DS encompassed an alternate region south of the current alignment. The southern deep location (OM-DS) was selected as the punchout location due to to a slightly shallower and larger bench that would allow longer bottom times for divers and a greater margin of error for the punchout.

To delineate each orthomosaic site, scale bars marked with colored tape at 10-centimeter (cm) intervals were placed on the corners of each site to provide scale to photographs. To collect photographs for orthomosaics, the survey team used digital mirrorless cameras in underwater housings to acquire multiple overlapping photographs of the seafloor that comprise each of the two orthomosaic survey sites. Divers swam parallel lines (boustrophedonic pattern) above the seafloor over the entire marked area while continually photographing the benthic surface. Roughly 500 photographs were collected at each site.

To construct orthomosaics, individual photographs were initially processed using Adobe Bridge and Adobe Photoshop software. Agisoft Metashape Pro software was then used to combine all images within a site to create a digital elevation model and output a seamless high-resolution orthomosaic. The orthomosaics were then color-corrected and adjusted in Adobe Photoshop.

After orthomosaics were constructed, a marine biologist analyzed each orthomosaic to quantify percent cover of all biotic and abiotic benthic surface cover or size-class frequency of corals. Percent cover by point count analysis was calculated at the two shallow OM sites (OM-N and OM-S). For this analysis Adobe Photoshop was used to place two hundred points in a grid pattern on the seafloor within each orthomosaic. A marine biologist classified the surface type underlying each point as coral, other invertebrate, algae, or abiotic substrate. Classifications of biotic cover were made to the most specific level possible, typically to the species level. Points were tabulated and summarized using Microsoft Excel where the resulting data set provides percent cover of all surface types.

As the deep region is the preferred location for the punchout, coral size-class frequency analysis was conducted on orthomosaics constructed at the deep sites (OM-DN and OM-DS). Size-class frequency is a robust analysis that provides species identification and longest diameter for all coral colonies located withing the orthomosaic. Size-class frequency of corals was determined using ImageJ, a public domain Java image-processing program. Every coral colony within the two deep orthomosaics was identified to the species level and numbered sequentially. The longest diameter of each colony was then measured and binned into one of the following size classes (in cm): 0 – 5, >5-10, >10 – 20, and >20 – 40. Results were tabulated using Microsoft Excel and provide a quantitative description of all corals in the vicinity of the proposed deep punchouts. As the sizes of the orthomosaics constructed at the two deep sites varied by a factor of 2, data from the two sites was normalized and reported as number of colonies per 1,000 ft^2 (93 m^2).

Table 1 Coordinates and Depths for Orthomosaics at all Proposed Punchout Locations

PUNCHOUT	LATITUDE	LONGITUDE	DEPTH 1 (m)	DEPTH 2 (m)
ORIGINAL* (OM-N and OM-S)	22° 0.419'N	159° 19.419'W	17	19
DEEP-NORTH (OM-DN)	22° 0.419'N	159° 19.411'W	24	26
DEEP-SOUTH (OM- DS)	22° 0.414'N	159° 19.412'W	24	26

*These coordinates represent the mid-point of the south edge of OM-N and the mid-point of the north edge of OM-S (Figure 2).

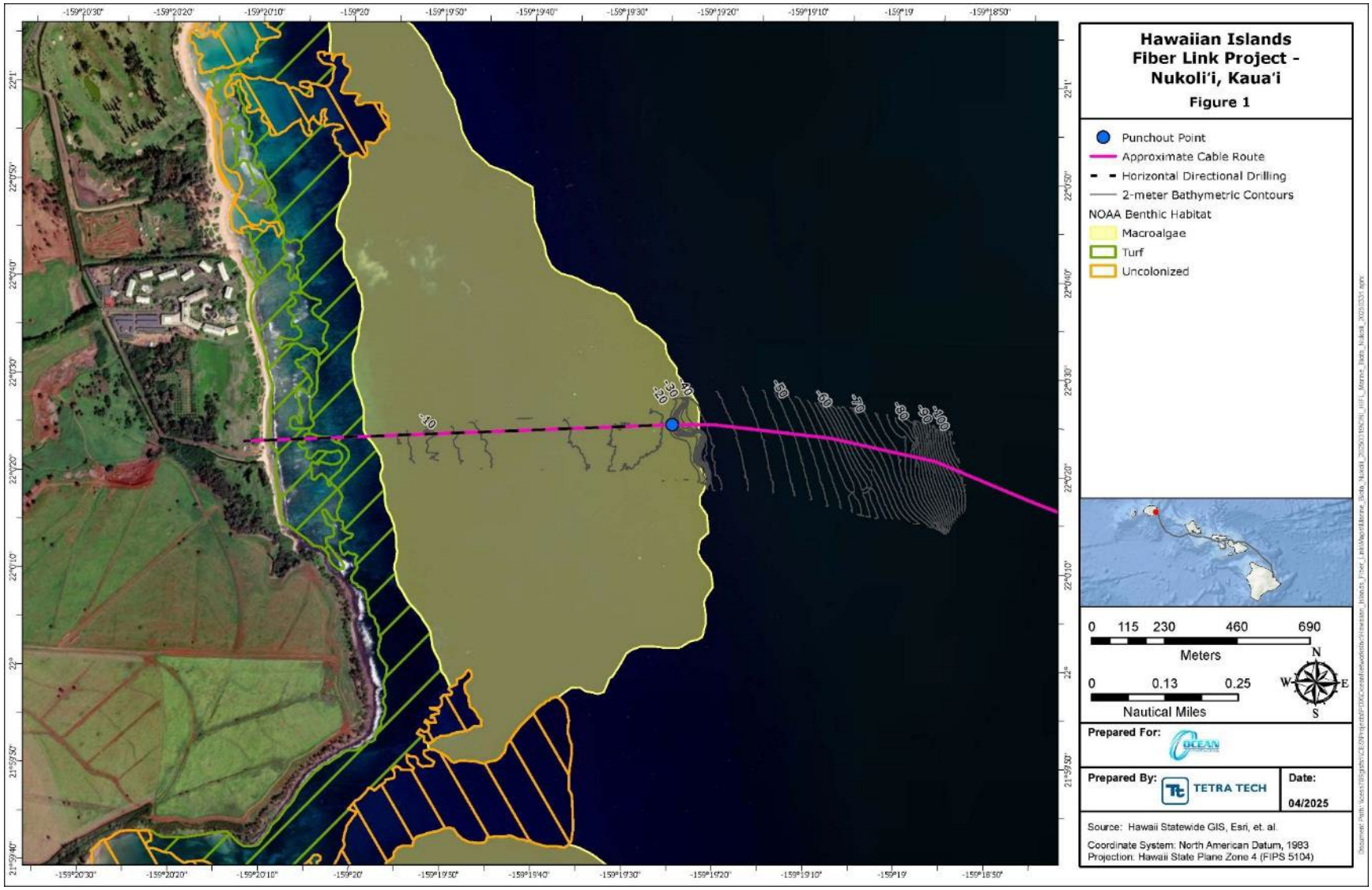


Figure 1 **Aerial Photograph of Marine Area Offshore of Nukoli'i Showing the HIFL Punchout Point and Proposed Cable Route**

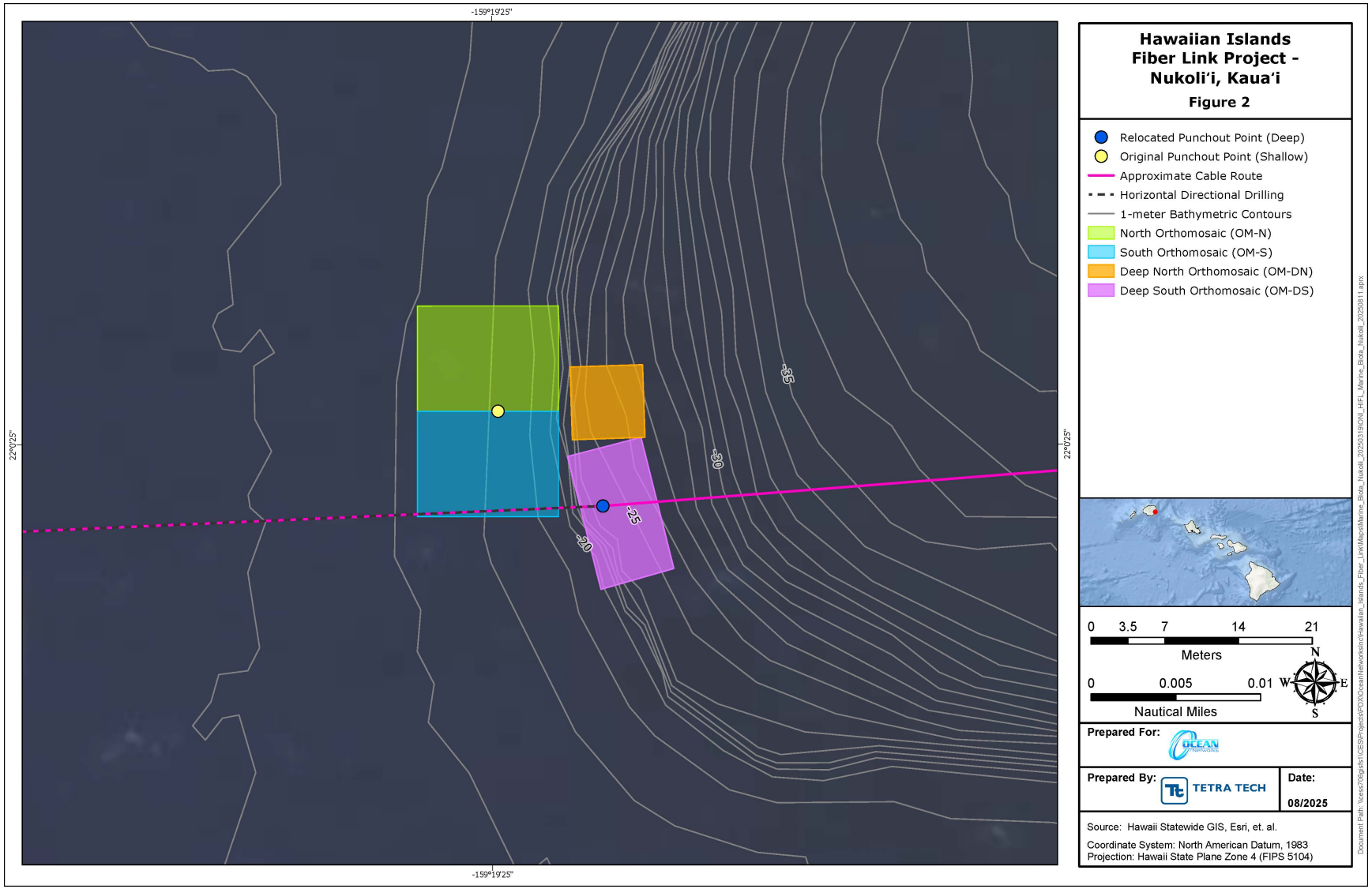


Figure 2 **Map Showing Original Punchout Point, Relocated (Deep) Punchout Point, Cable Route, Orthomosaic Locations, and Qualitative Survey Area**

3 RESULTS

3.1 ORIGINAL (SHALLOW) PUNCHOUT POINT

The seafloor in the vicinity of the original punchout point consisted of a homogenous gently sloping limestone fossil reef platform that did not contain any sand channels or other dominant physical features (Figure 3). No dense aggregations of coral forming modern reef structure were observed. Corals were present as sparsely distributed small encrusting colonies comprised of species commonly found in nearshore waters of the Main Hawaiian Islands. Although not present on the shallow bench that encompassed the shallow punchout point, multiple colonies of (Hawaiian black coral) were present offshore of the shallow punchout. Should the shallow punchout point be utilized for the project, the cable would pass through these colonies of *A. griggi*. This species is discussed further in Section 3.2 below. No *Halophila* spp. (seagrass) was observed during the survey of the original punchout.

3.1.1 Percent Cover

Quantitative benthic cover data at the original punchout point was derived from point counts of two orthomosaics (OM-N and OM-S) constructed at the punchout (Figure 4, Figure 5, Table 2). The primary component of the benthic surface was algae colonizing limestone fossil reef (87.0%), with 66.5% of total cover comprised specifically of turf algae. Turf algae is a ubiquitous component of nearshore Hawaiian reefs and is made up of small multi-species assemblages of algae.

The only species of coral encountered in point count analysis was *Pocillopora meandrina* (cauliflower coral), which comprised 1.50% of the benthic surface. The total abiotic component of the seafloor, consisting of sand, rubble, limestone fossil reef, and dead coral, was 11.50%.

3.1.2 Coral

Biologists compiled a list of all species observed in the vicinity of the original punchout point (Table 3). In total, six species of coral were present. Colonies of *P. meandrina* (cauliflower coral) ranged in size from 5 cm to ~40 cm in diameter (Figure 6, top left). *Pocillopora meandrina* (cauliflower coral) is a pioneering species that is the first to populate available substrate and grows under conditions that are typically too harsh for other species. *Pocillopora meandrina* has a finite life span and typically lives 20 to 50 years under suitable conditions. A single colony of *Pocillopora grandis* (antler coral) was estimated to have a diameter of ~50 cm (see cover photo). All other species were present as small colonies typically less than 10 cm in diameter (Figure 6).

3.1.3 Non-Coral Invertebrates

Three non-coral invertebrates comprised of one sea cucumber (*Holothuria atra* [black sea cucumber]) and two sea stars (*Culcita novaeguineae* [cushion sea star]) were

observed in the vicinity of the original punchout location (Table 3). These three species are commonly found in Hawaiian coastal waters.

3.1.4 Fish

Ten species of fish within seven families were observed in the vicinity of the original punchout (Table 4). Fish were primarily observed as individuals transiting the area or as individuals sheltering within small holes in the reef surface (Figure 7). A large colony of *Pocillopora grandis* (antler coral) provided shelter for several *Dascyllus albisella* (Hawaiian dascyllus) and *Paracirrhites arcatus* (arceye hawkfish) (Figure 8).

3.2 RELOCATED (DEEP) PUNCHOUT POINT

Approximately 7 m offshore (east) of the original punchout point, the gently sloping reef platform terminates abruptly in a sharp vertical shelf break (Figure 9). Below the top of the shelf break, the vertical face is undercut with a notch that extends under the overhang for ~2 m. The vertical cliff terminates in a relatively flat, gently sloping limestone fossil reef surface at a depth of ~25 m (Figure 12, Figure 13). *Halophila* spp. (seagrass) was not observed during the survey of the deep platform.

3.2.1 Coral

The entire length of the upper edge (ceiling) of the undercut notch is populated by multiple colonies of *A. griggi* (Figure 10, Figure 11). The largest colonies of *A. griggi* were approximately 1 m in length. Three species of stony coral (Scleractinians), two species of black coral, and one species of soft coral were observed during surveys on the deep platform (Table 3, Figure 14).

As the deep platform may be the preferred location for the punchout, a quantitative analysis of marine resources (corals) was conducted in two orthomosaics constructed on the deep platform (Figure 2, Figure 15, Figure 16). Coral size-class frequency analysis revealed that, overall, three times more corals were present at the southern site (OM-DS) than at the northern site (OM-DN) (Table 5). The biggest difference was in the small size classes (<10 cm in longest diameter) with 4 colonies per 1,000 ft^2 at OM-DN and 27 colonies per 1,000 ft^2 at OM-DS. When considering only corals >10 cm, the density of colonies at the southern site (30 colonies per 1,000 ft^2) was roughly double the density at the northern site (14 colonies per 1,000 ft^2).

Two species of stony coral and one species of soft coral (Alcyonacea) were present at the two deep orthomosaic sites. The stony corals, *Pocillopora meandrina* (cauliflower coral) and *Porites lobata* (lobe coral), were present at both sites; while the soft coral, *Sinularia densa* (dense leather coral) was only present at the southern site (OM-DS). With 12 and 38 colonies per 1,000 ft^2 at OM-DN and OM-DS, respectively, *P. mea*ndrina was the most prevalent species of coral on the deep platform. The density of *P. lobata* at OM-DN and OM-DS was 6 and 14 colonies per 1,000 ft^2, respectively. At OM-DS, 5 colonies of *S. densa* were present, all of which were smaller than 10 cm in longest diameter.

Owing to depth limitations, it was not possible to survey more than a few meters offshore of the proposed deep punchout point. However, the limestone fossil reef platform extended to the limits of underwater visibility. Scattered colonies of *P. meandrina* were visible for approximately 10 m offshore of the deep punchout point.

3.2.2 Non-Coral Invertebrates

Three non-coral invertebrates comprised of one sea cucumber (*H. atra* [black sea cucumber]), a sea star (*Leiaster leachi* [purple velvet star]), and a sponge were observed in the vicinity of the relocated deep punchout location (Table 3). These three organisms are commonly found in Hawaiian coastal waters.

3.2.3 Fish

Seventeen (17) species of fish within 11 families were observed under the ledge and on the deep platform (Table 4). Of note was a school (~20 individuals) of *Caranx ignobilis* (giant trevally or white ulua) that was swimming in circular patterns in and out of the undercut beneath the ledge during the survey conducted in November 2024 (Figure 17). The school was not present during the survey conducted in April 2025. *Caranx ignobilis* is a popular fish with local speardivers and isn't commonly seen at SCUBA depths around the Main Hawaiian Islands. A large school (200+ individuals) of the invasive *Lutjanus Kasmira* (bluestripe snapper) was observed swimming above the limestone reef platform during both surveys (Figure 12, Figure 18). The undercut ledge provided shelter for mixed schools of *Myripristis* spp. (soldierfish) as well as small aggregations of *Zanclus cornutus* (Moorish idol) (Figure 19). All other species of fish were observed as individuals or small groups transiting the area.

Table 2 Percent of all Benthic Cover from Orthomosaics OM-N and OM-S Adjacent to the Original Punchout (Shallow)

CATEGORY	SPECIES	COVER
CORAL	*Pocillopora meandrina*	**1.50%**
ALGAE	Crustose Coralline Algae	**1.75%**
	Cyanobacteria	**0.25%**
	Halimeda sp.	**1.25%**
	Mixed Macroalgae	**17.25%**
	Turf Algae	**66.50%**
HARD SUBSTRATE	Dead Coral	**1.75%**
	Limestone Fossil Reef	**6.50%**
UNCONSOLIDATED SUBSTRATE	Rubble	**0.25%**
	Sand	**3.00%**

Table 3 All Species of Invertebrates and Macroalgae Observed During Marine Biota Surveys near the Original Punchout (Shallow) and Relocated Punchout (Deep)

CATEGORY	SPECIES NAME	COMMON NAME	SHALLOW	DEEP
STONY CORAL	*Leptastrea purpurea*	Encrusting coral	X	-
	Leptoseris incrustans	Crust coral	-	X
	Montipora capitata	Rice coral	X	-
	Montipora patula	Ringed rice coral	X	-
	Pocillopora grandis	Antler coral	X	-
	Pocillopora meandrina	Cauliflower coral	X	X
	Porites compressa	Finger coral	X	-
	Porites lobata	Lobe coral	X	X
BLACK CORAL	*Antipathes griggi*	Hawaiian black coral	X*	X*
	Cirrhipathes anguina	Wire coral	-	X
SOFT CORAL	*Sinularia densa*	Dense leather coral	X	X
ALGAE	Crustose Coralline Algae (CCA)	CCA	X	X
	Cyanobacteria	Cyanobacteria	X	X
	Dictyosphaeria versluysii	Hard bubble seaweed	-	X
	Dictyota spp.	Dictyota algae	X	-
	Galaxaura rugosa	Stout galaxaura algae	-	X
	Halimeda discoidea	Rosette halimeda	X	-
	Halimeda opuntia	Prickly pear halimeda	X	X
	Hydrolithon spp.	Hydrolithon CCA	X	X
	Lithophyllum kotschyanum	Stubby coralline algae	X	-
	Neomeris sp.	Neomeris algae	X	X
	Peyssonnelia spp.	Peyssonnelia CCA	X	X
	Sporolithon spp.	Patchy red coralline algae	X	X
NON-CORAL INVERTEBRATES	*Culcita novaeguineae*	Cushion sea star	-	X
	Holothuria atra	Black sea cucumber	X	X
	Leiaster leachi	Purple velvet star	X	X
	Porifera	Sponge	X	-

NOTES: "X" = Present, "" = Black coral was observed on the overhang below the shallow punchout and above the deep punchout. Utilizing the deep punchout would avoid affecting the black coral.*

Table 4 All Species of Fish Observed near the Original Punchout (Shallow) and Relocated Punchout (Deep)

FAMILY	SPECIES	COMMON NAME	SHALLOW	DEEP
Acanthuridae (Surgeonfishes)	*Acanthurus olivaceus*	Orangeband surgeonfish	-	C
	Acanthurus triostegus	Convict tang	-	C
	Acanthurus xanthopterus	Yellowfin surgeonfish	-	C
	Naso hexacanthus	Sleek unicornfish	-	C
	Zebrasoma flavescens	Yellow tang	-	C
Balistidae (Triggerfishes)	*Melichthys vidua*	Pinktail triggerfish	C	C
	Sufflamen bursa	Lei triggerfish	C	-
Carangidae (Jacks)	*Caranx ignobilis*	Giant trevally	-	C
Chaetodontidae (Butterflyfishes)	*Chaetodon kleinii*	Blacklip butterflyfish	-	R
	Chaetodon lunula	Raccoon butterflyfish	-	R
	Forcipiger sp.	Longnose butterflyfish	-	R
	Heniochus diphreutes	Pennant butterflyfish	C	-
Cirrhitidae (Hawkfishes)	*Paracirrhites arcatus*	Arceye Hawkfish	C	-
Holocentridae (squirrelfishes)	*Myripristis* spp.	Soldierfish	-	C
Labridae (Wrasses)	*Bodianus albotaeniatus*	Hawaiian hogfish	-	R
	Thalassoma duperrey	Saddle wrasse	C	-
Lutjanidae (Snappers)	*Lutjanus kasmira*	Bluestripe snapper	-	A
Mullidae (goatfishes)	*Parupeneus multifasciatus*	Manybar goatfish	-	C
Pomocentridae (Damselfishes)	*Dascyllus albisella*	Hawaiian damselfish	C	-
	Chromis verater	Threespot chromis	R	C
Tetraodontidae (Pufferfishes)	*Canthigaster coronata*	Crown pufferfish	R	-
	Canthigaster jactator	Hawaiian whitespotted pufferfish	C	C
Zanclidae (Moorish idols)	*Zanclus cornutus*	Moorish idol	R	C

NOTES: "A" = Abundant; "C" = Common; "R" = Rare within the area surveyed.

4 SUMMARY and DISCUSSION

Surveys of the original and two alternative HDD punchout points were conducted in November 2024 and April 2025, respectively. The original location of the punchout point on a limestone fossil reef platform at ~20 m of water depth did not appear to present any substantial issues with respect to impacts to biotic resources. Corals adjacent to the original punchout were sparse and those that were greater than 10 cm in diameter could be easily relocated to provide a suitable clear space for the HDD punchout. However, utilization of this punchout location would require the emergent cable to pass over the sharp shelf break and descend in a free-hanging or vertical fashion over the undercut cliff face to reach the deeper limestone fossil reef platform. Such a plan would require employing considerations to avoid areas that are populated with *Antipathes griggi* (Hawaiian black coral). In addition, attachment of the cable to the vertical face of the ledge would likely be necessary to avoid movement and abrasion.

An alternate strategy being considered is to place the HDD punchout just seaward of the base of the vertical cliff at the deep site (water depth of ~25 m). Such a plan would eliminate potential impacts to the black coral and eliminate vulnerability of the cable that could occur if the cable were to descend vertically over the cliff. Surveys conducted of the region seaward of the cliff face revealed that the area consists of a relatively flat, hard, limestone fossil reef surface. Coral on the platform consisted primarily of widely spaced hemispherical branching colonies of *P. meandrina*. Owing to the branching yet sturdy growth form of this species, *P. meandrina* is amenable to removal and relocation with minimal breakage. No seagrass was present in the area and no species listed as threatened or endangered under the Endangered Species Act were observed during the surveys.

Results of the surveys suggest that relocating the punchout location to the limestone platform seaward of the cliff (revised deep location) would not present a stress on the existing resident biota. Should any corals occur directly in the small footprint of the punchout, they could be easily relocated to the adjacent seafloor if necessary.

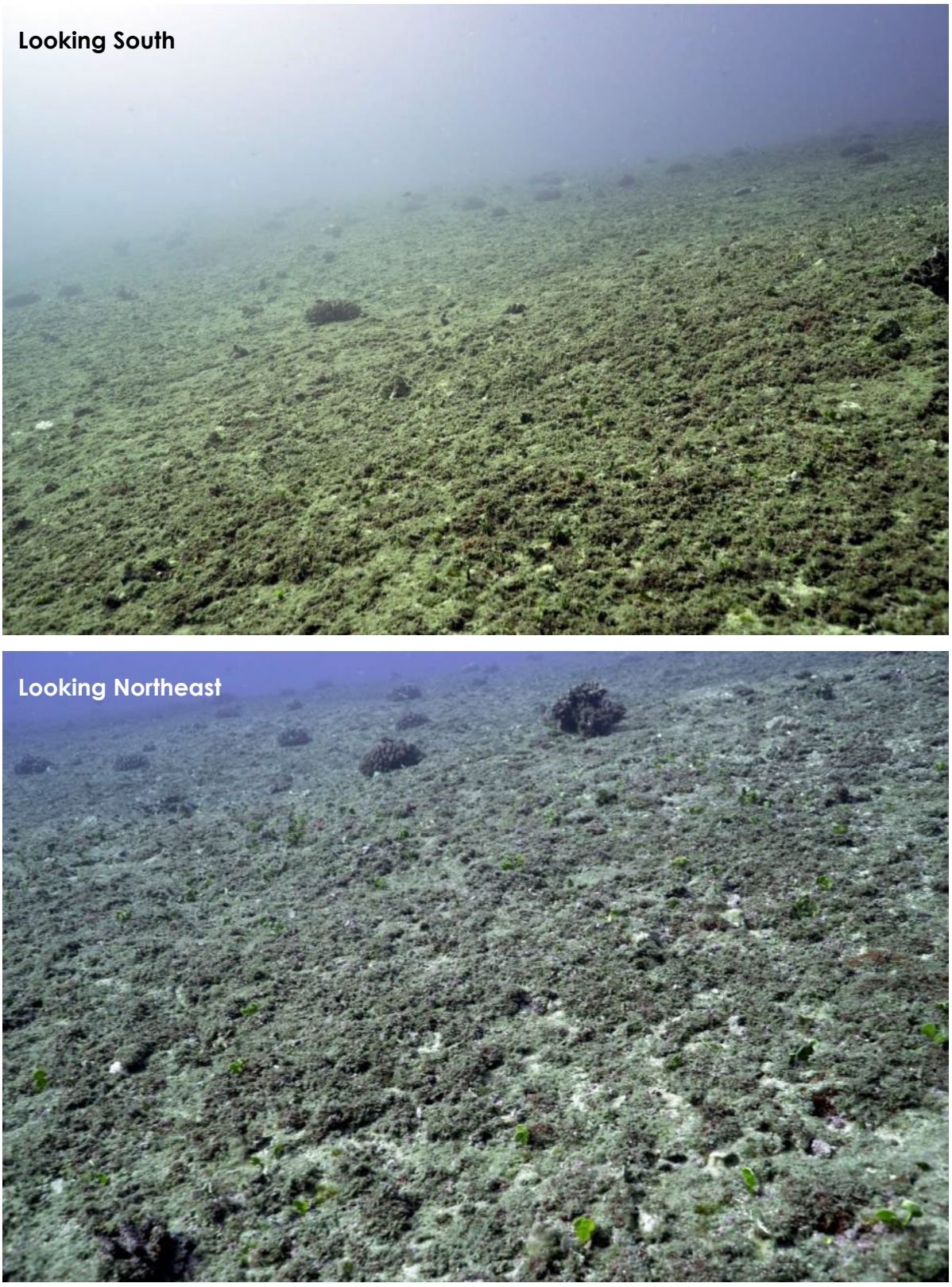


Figure 3 Seafloor Adjacent to the Original Nukoli‘i Punchout Point (depth ~20 m)



Figure 4 North Orthomosaic (OM-N) (North Up)

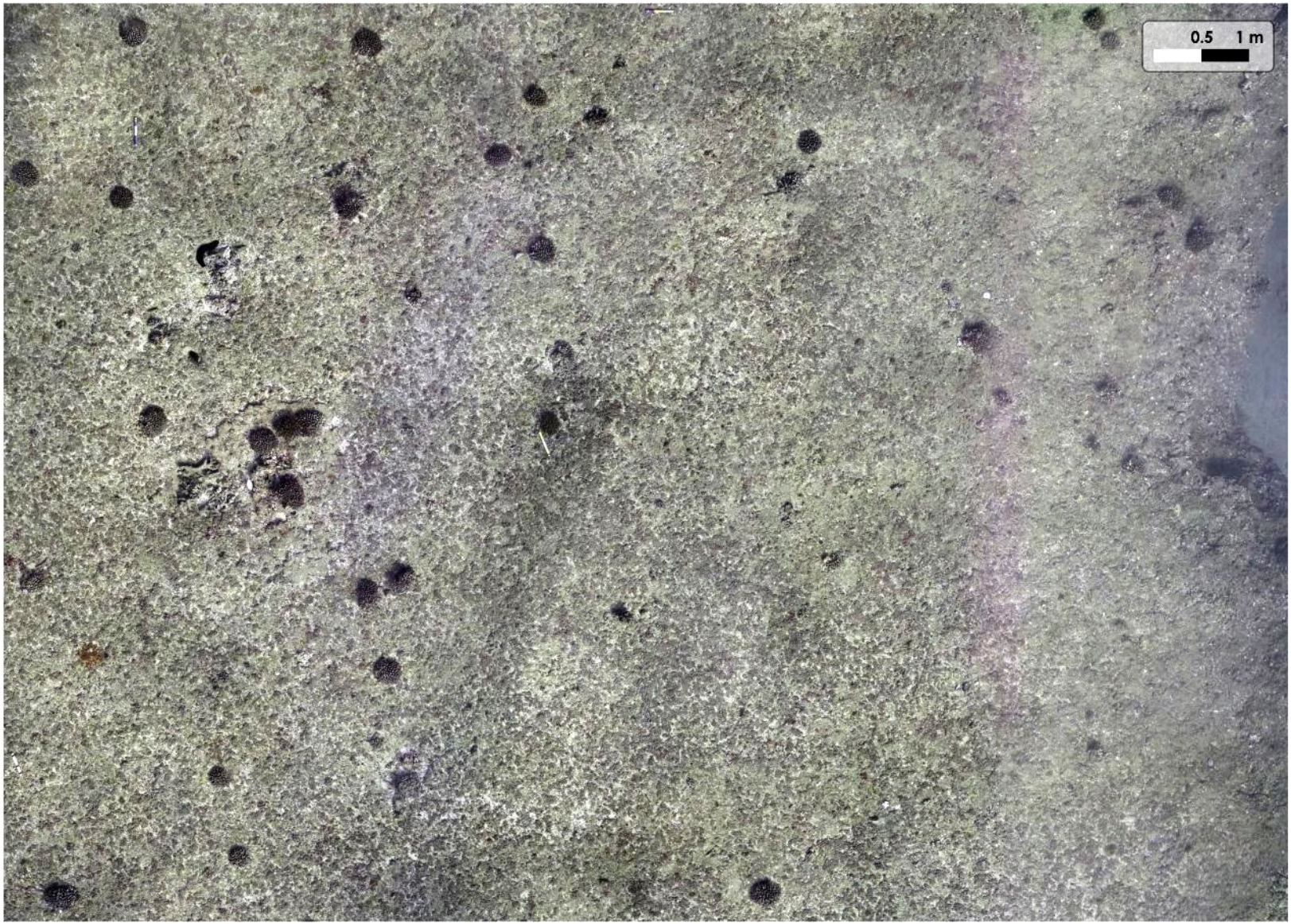


Figure 5 South Orthomosaic (OM-S) (North Up)

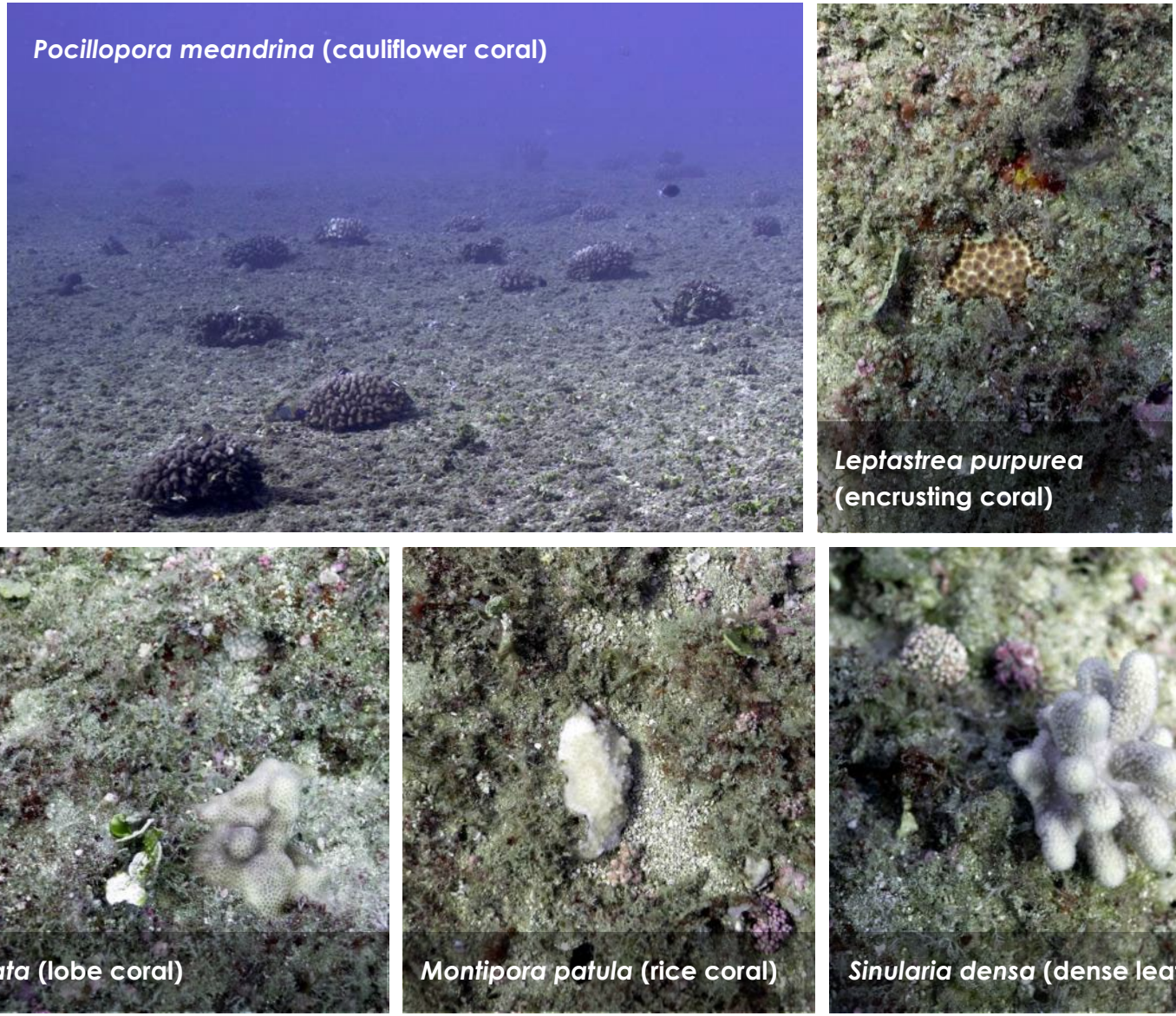


Figure 6 Corals Observed in the Immediate Vicinity of the Original (Shallow) Punchout Point

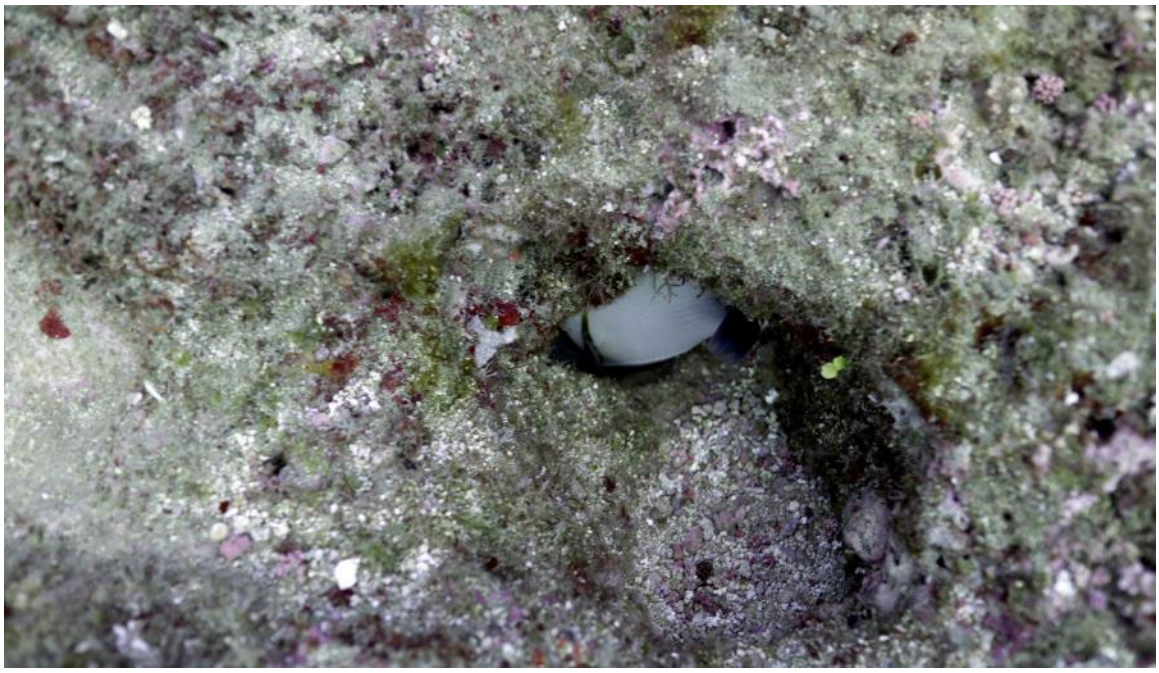


Figure 7 Lei triggerfish (*Sufflamen bursa*) Sheltering in a Hole in the Reef Surface in the Vicinity of the Original (Shallow) Punchout Point (Depth ~20 m)



Figure 8 *Dascyllus albisella* (Hawaiian dascyllus) and *Paracirrhites arcatus* (arceye hawkfish) Sheltering in *Pocillopora grandis* (antler coral) in the Vicinity of the Original (Shallow) Punchout Point (Depth ~20 m)

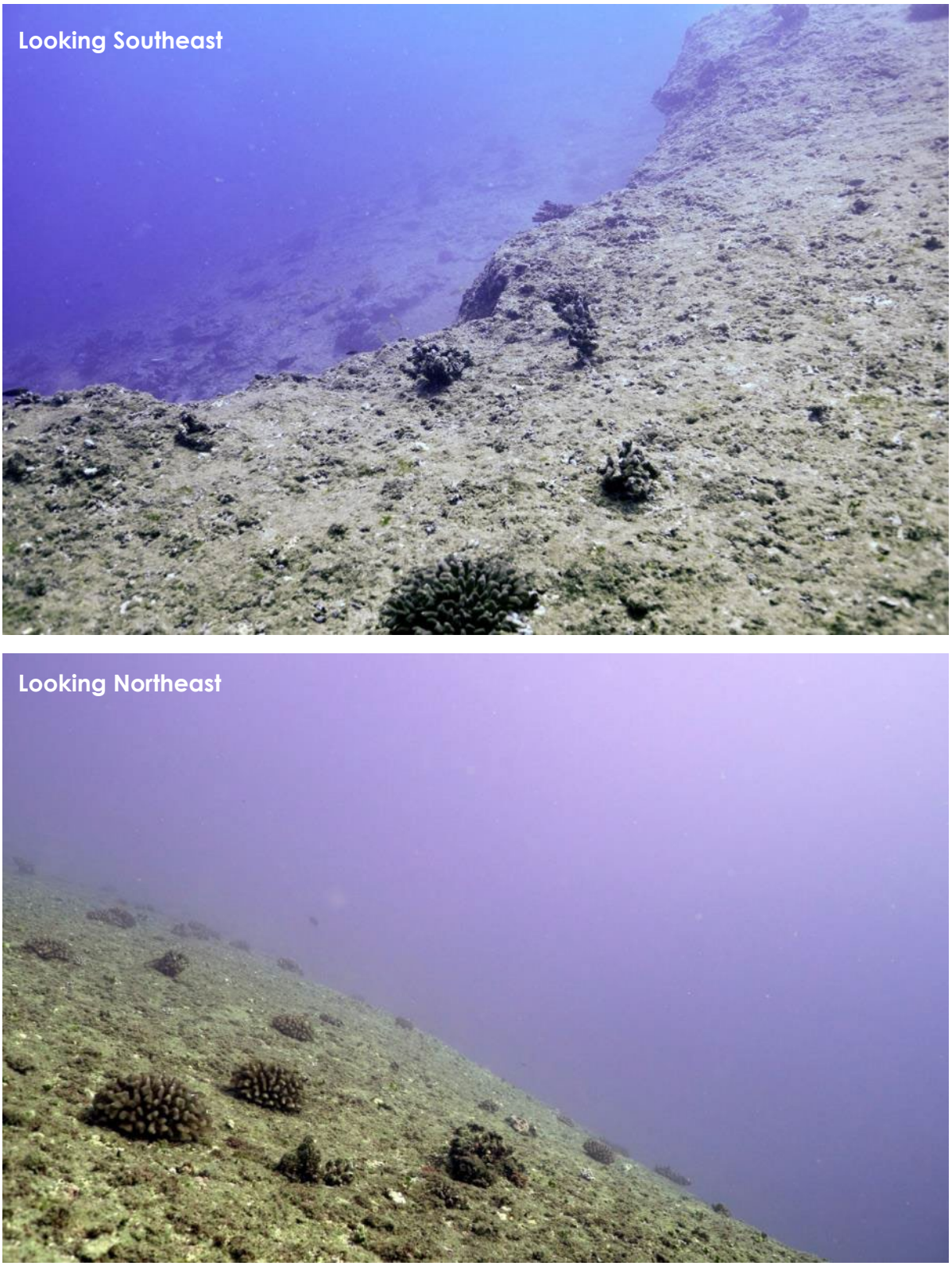


Figure 9 Shelf Break Seaward of the Original (Shallow) Punchout Point and Shoreward of the Revised (Deep) Punchout Point (Depth ~21 m)

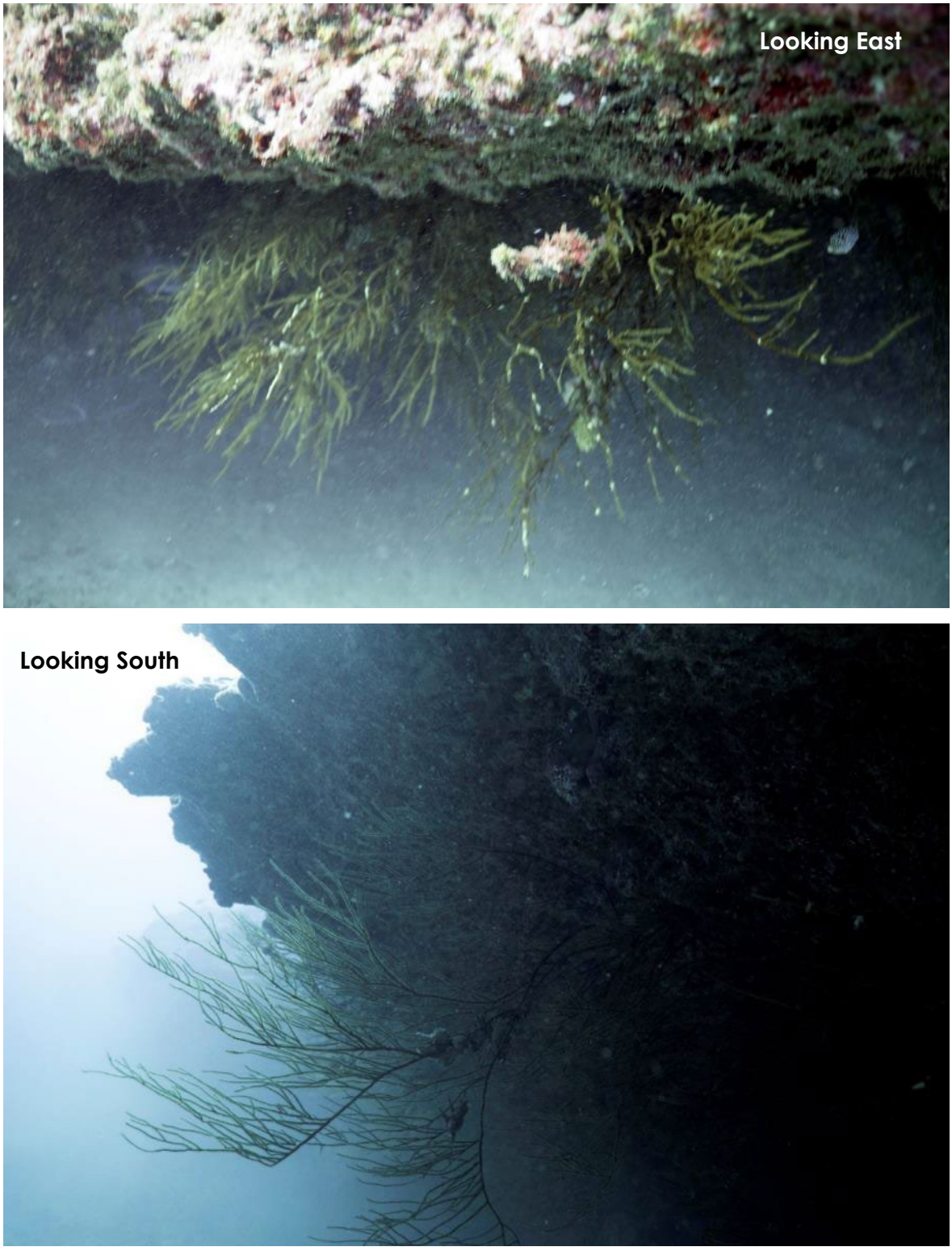


Figure 10 Undercut Notch on Vertical Cliff along West Edge of the Deep Site Colonized by *Antipathes griggi* (Hawaiian black coral, largest colonies ~ 1 m in length) (Depth ~23 m)



Figure 11 Undercut Notch on Vertical Cliff Dropoff Colonized by *Antipathes griggi* (Hawaiian black coral, largest colonies ~ 1 m in length) (depth ~23 m) and Seafloor at Base of Cliff (Depth ~25 m). Photo located above the Deep Site.

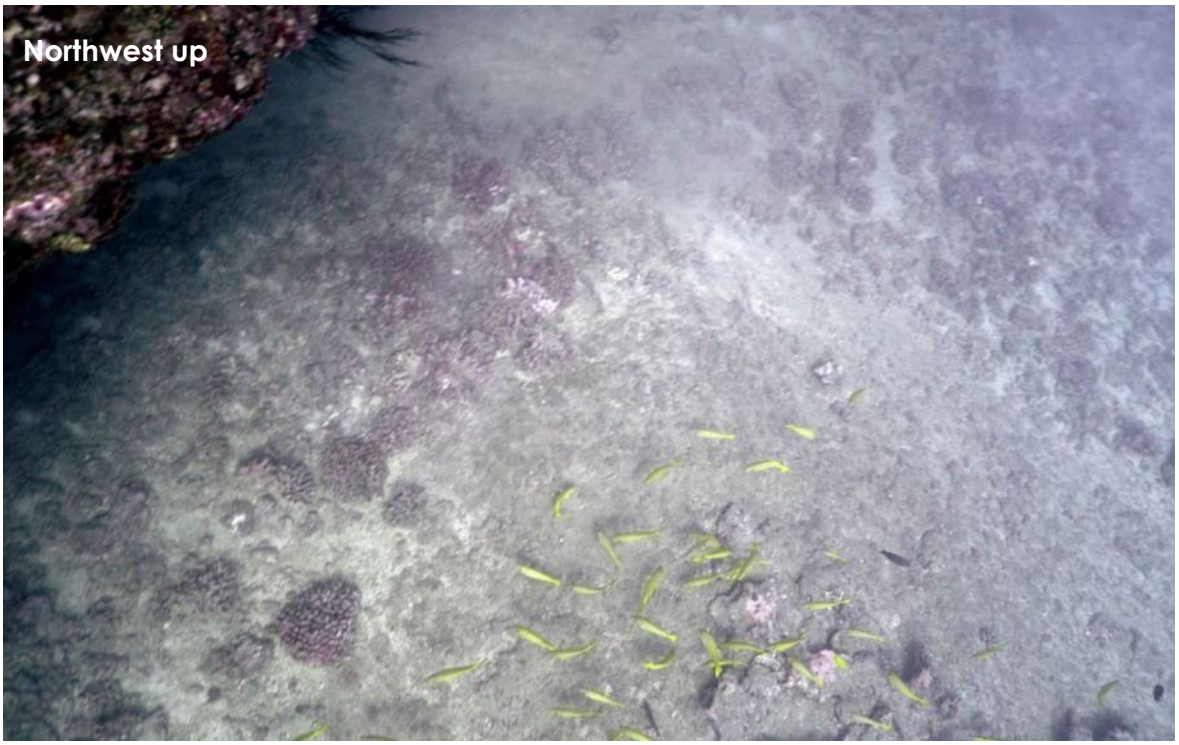


Figure 12 Colonies of *Pocillopora meandrina* (cauliflower coral) and School of *Lutjanus kasmira* (bluestripe snapper) at Base of Cliff (Depth ~25 m)

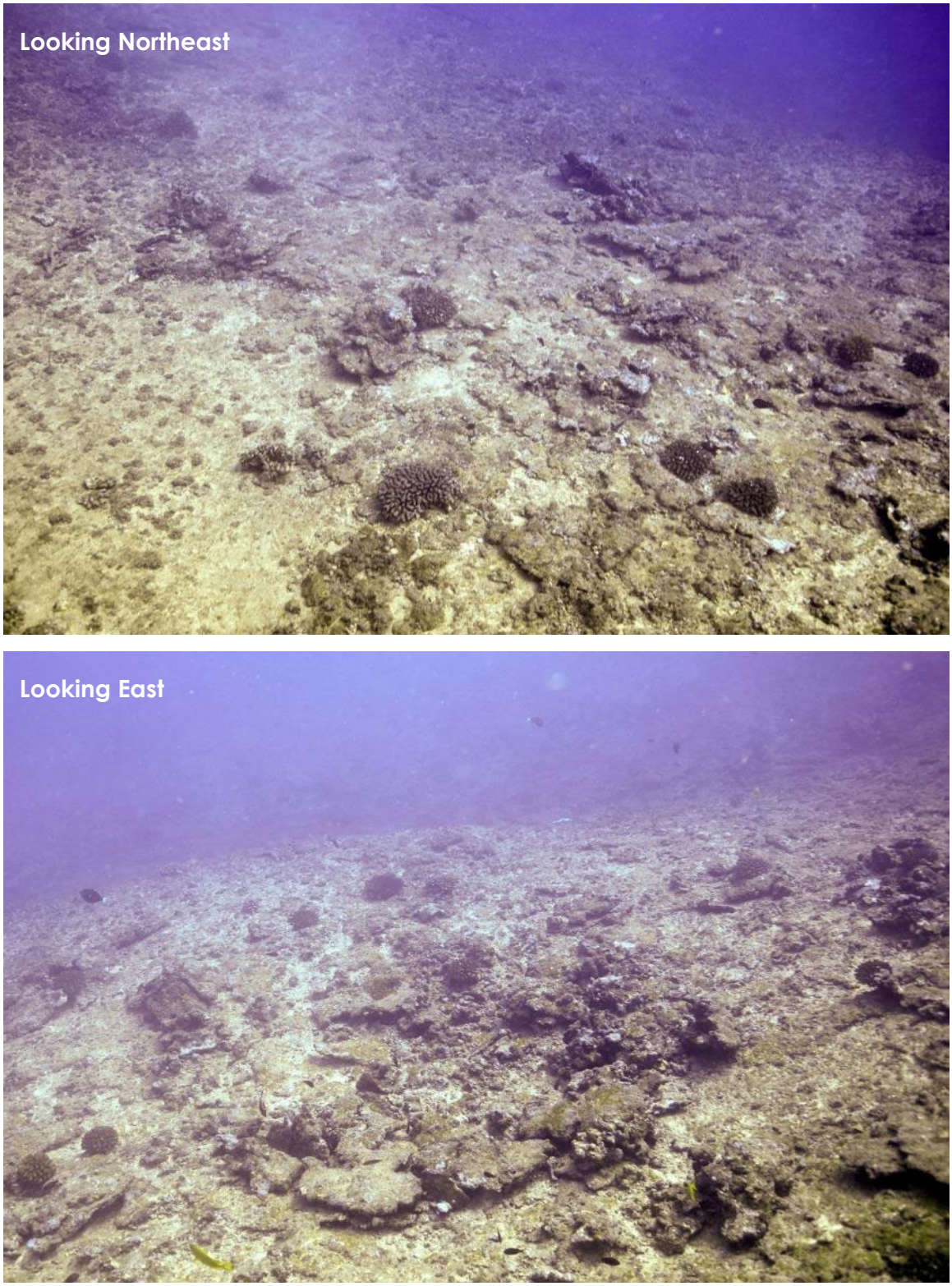


Figure 13 **Two Views of the Seafloor Offshore of the Cliff in the Vicinity of the Relocated (Deep) Punchout Point (Depth ~25 m)**

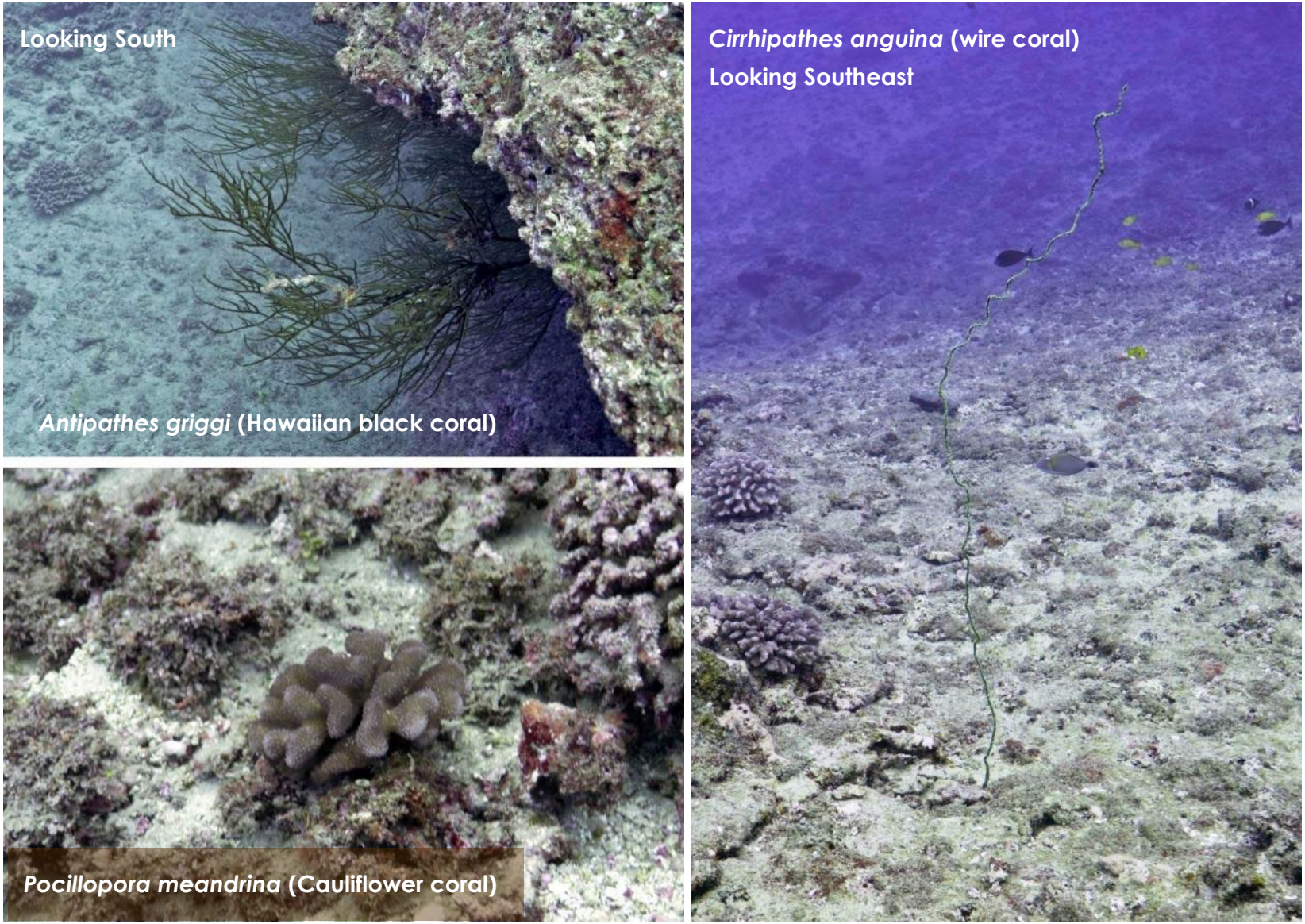


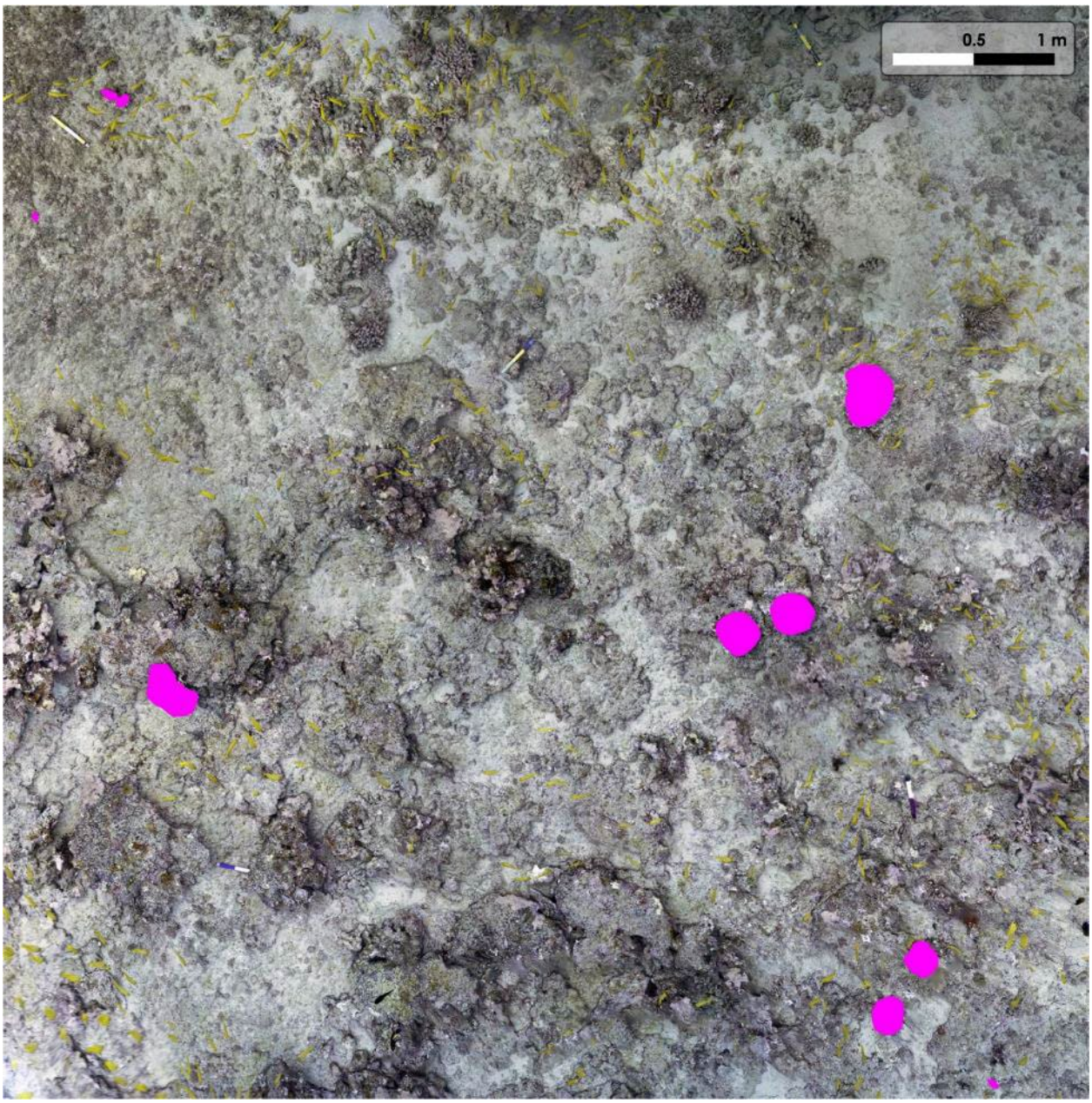
Figure 14 Corals Observed in the Vicinity of the Proposed Deep Punchout Location

Table 5 Number of Coral Colonies by Species and Size Class at Deep Orthomosaic Sites OM-DN and OM-DS

SPECIES	SIZE CLASS (cm)	DEEP-NORTH (OM-DN)*	DEEP-SOUTH (OM-DS)*
Pocillopora meandrina	>0 – 5	-	4
	>5 – 10	-	4
	>10 – 20	-	4
	>20 – 40	12	26
	TOTAL	**12**	**38**
Porites lobata	>0 – 5	2	11
	>5 – 10	2	3
	>10 – 20	2	-
	TOTAL	**6**	**14**
Sinularia densa [+]	>0 – 5	-	4
	>5 – 10	-	1
	TOTAL	**-**	**5**
ALL CORALS	**>0 – 5**	**2**	**19**
	>5 – 10	**2**	**8**
	>10 – 20	**2**	**4**
	>20 – 40	**12**	**26**
	TOTAL	**18**	**57**

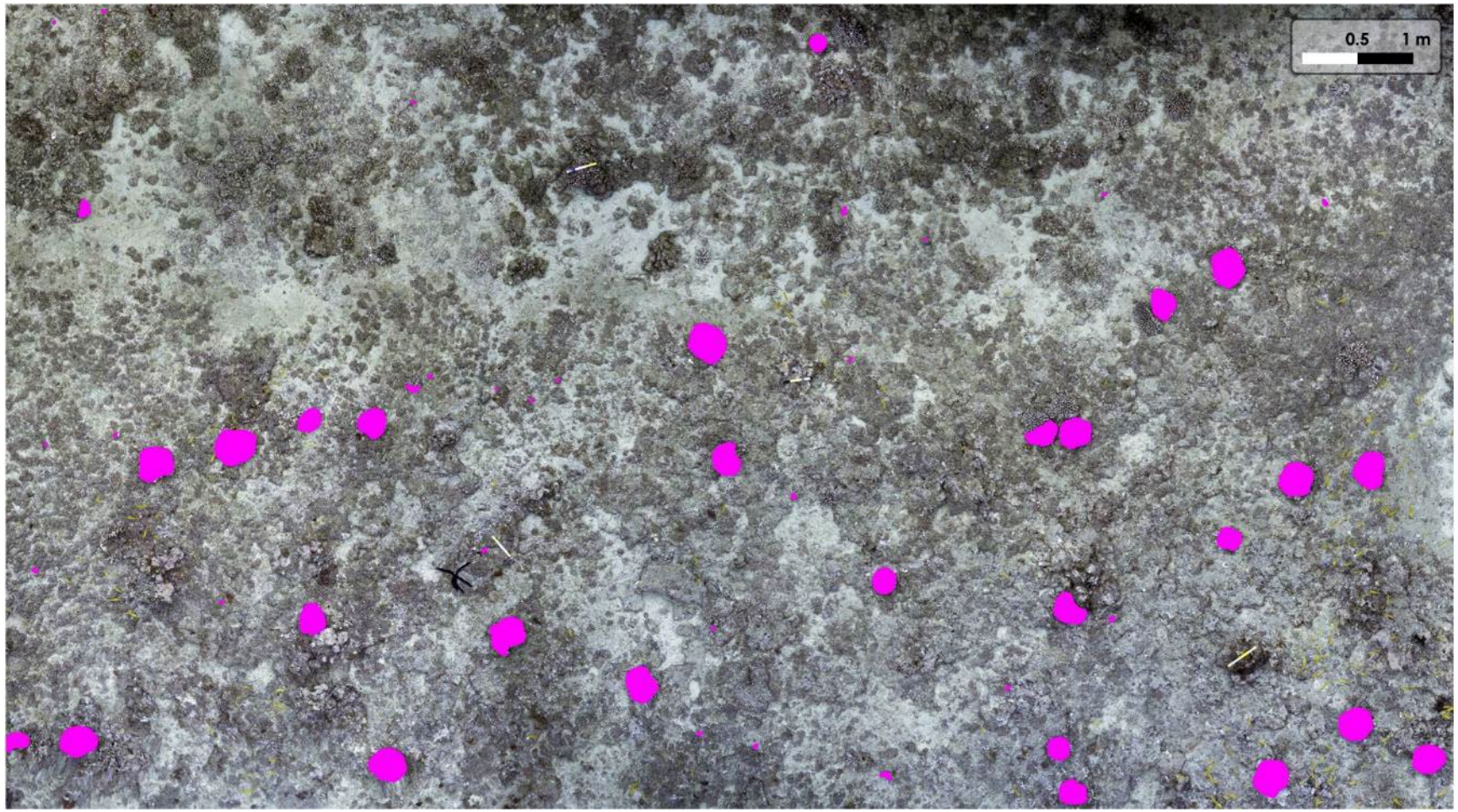
*Data normalized to 1,000 ft^2 (93 m^2)

[+]Soft coral



NOTES: Living coral tissue is colored in magenta.

Figure 15 Orthomosaic of the Deep North Site (OM-DN) (North Right)



NOTES: Living coral tissue is colored in magenta.

Figure 16 Orthomosaic of the Deep South Site (OM-DS) (North Right)

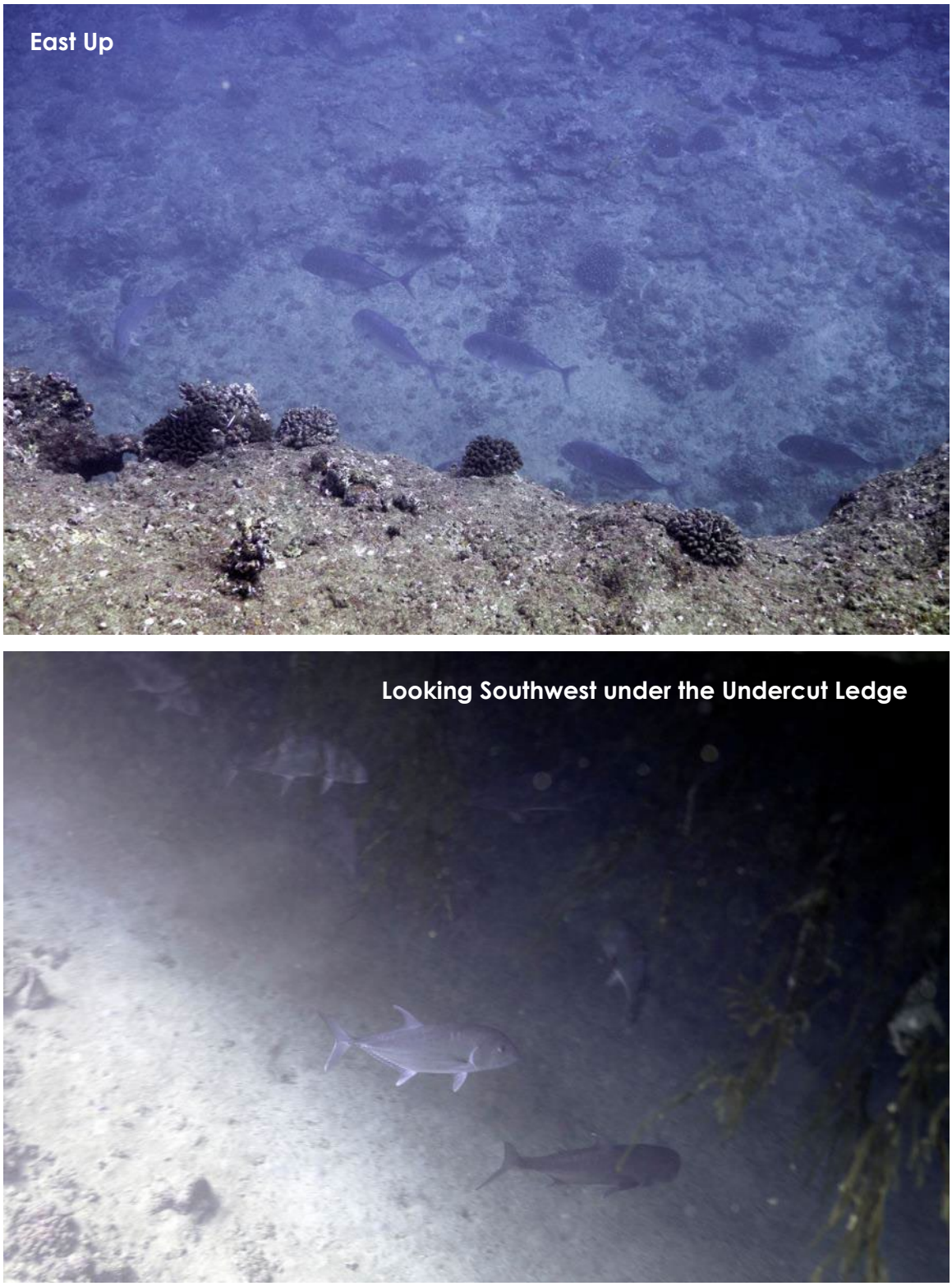


Figure 17 School of *Caranx ignobilis* (giant trevally or white ulua) Schooling Beneath the Undercut Ledge (Depth ~23 m)

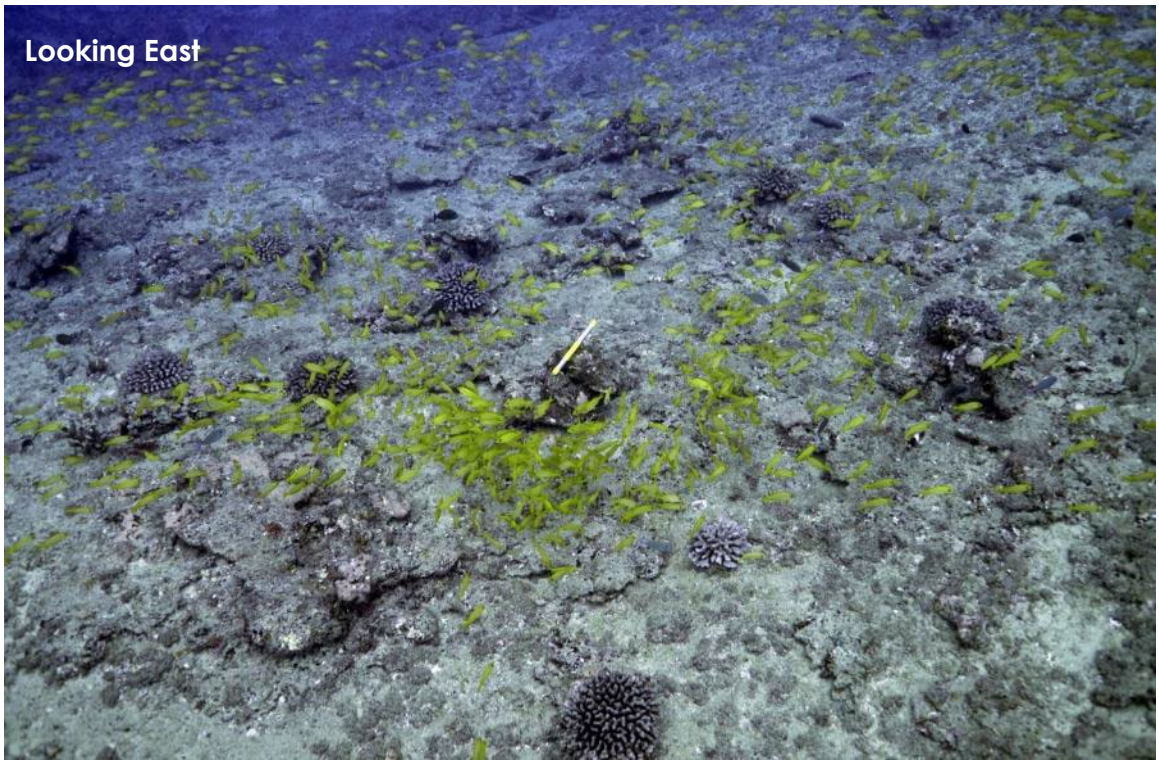


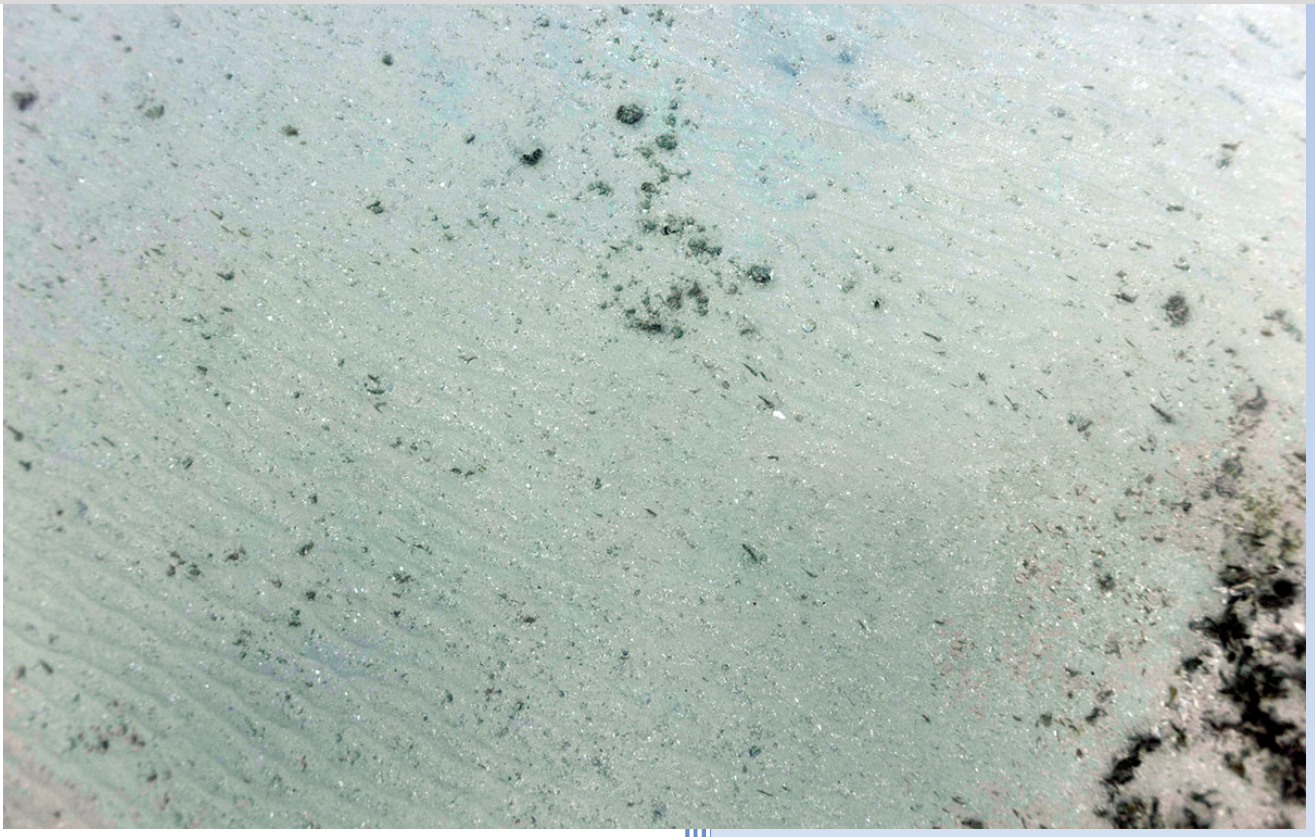
Figure 18 **Large School of *Lutjanus kasmira* (bluestripe snapper) on the Deep Platform (Depth ~25 m)**



Figure 19 **Undercut Ledge Providing Shelter for *Myripristis* spp. (Soldierfish) and *Lutjanus kasmira* (bluestripe snapper) (Depth ~25 m)**

MARINE RESEARCH CONSULTANTS, INC.

Marine Biota Survey – Hawaiian Island Fiber Link Project
Barbers Point, O‘ahu



SUBMITTED TO:
Ocean Networks, INC (ONI)
And Tetra Tech

PREPARED BY:
Marine Research Consultants, Inc.
46-312C Haiku Rd
Kaneohe, HI 96744
808-779-4009

DATE: September 19, 2025

TABLE OF CONTENTS

1 INTRODUCTION 1

2 METHODS 1

2.1 GENERAL SURVEY METHODS 1

2.2 HDD PUNCHOUT SURVEYS 2

2.2.1 Orthomosaic Surveys 2

2.2.2 Photodocumentation Surveys 3

2.3 SURFACE-LAID CABLE ROUTE 4

3 RESULTS 6

3.1 PHYSICAL STRUCTURE 6

3.2 HDD PUNCHOUT POINTS 6

3.3 SEAFLOOR ALONG SURFACE-LAID CABLE ROUTE 7

3.4 SPECIES PRESENT 7

4 SUMMARY 8

List of Figures

Figure 1 Aerial Photograph of the Southeast Corner of Oahu Showing the Proposed HDD Punchouts at Site 1 and Site 2, Bounce Dive Points, Surface-Laid Cable Routes, and NOAA Benthic Habitat Data 5

Figure 2 Former Shoreline Slope ~60 m Inshore of HDD Punchout for Site 2 12

Figure 3 Mixed Macroalgae and Seagrass (*Halophila* sp.) near Originally Proposed HDD Punchout for Site 1 13

Figure 4 Orthomosaic Constructed at HDD Site 1 14

Figure 5 *Pocillopora meandrina* (cauliflower coral) Growing on Anthropogenic Debris North of Site 2 15

Figure 6 Four Views of Sandy Seafloor at HDD Punchout for Site 2 16

Figure 7 Representative Images at P1 17

Figure 8 Representative Images at P2 18

Figure 9 Representative Images at P3 19

Figure 10 Representative Images at P4 (Top) and P5 (Bottom) 20

Figure 11 Representative Images of Fish 21

List of Tables

Table 1 Survey Type, Date of Survey, GPS Coordinates, and Water Depths for all Survey Locations 4

Table 2 All Species of Coral, Non-Coral Invertebrates, and Macroalgae Observed During Surveys at Barbers Point, O'ahu 9

Table 3 Point Count Analysis Showing Percent Cover of all Bottom Types in the Orthomosaic Constructed at Site 1 9

Table 4 Size-Class Frequency Analysis of Corals in the Orthomosaic Constructed at Site 1 10

Table 5 All Species of Fish Observed During Surveys at Barbers Point, O'ahu 11

1 INTRODUCTION

The Hawaiian Islands Fiber Link (HIFL) project is a proposed interisland subsea fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the State of Hawai'i. The Project involves construction, operation, and maintenance of a subsea cable that would interconnect the six main Hawaiian Islands, with cable landing sites located on Kaua'i (Nukoli'i Beach), O'ahu (Barbers Point), Maui (Kahului Harbor), Moloka'i (Moloka'i Yacht Club), Lāna'i (Mānele Harbor), and Hawai'i Island (Pacific Aquaculture & Coastal Resource Center, Hilo). The cable, which would have a maximum diameter of approximately 1.1 inches, would be surface laid on the seabed within state and U.S. federal waters between these sites. At all six of the cable landing sites, horizontal directional drilling (HDD) would be used to allow the cable to traverse underneath the shoreline between the onshore portion of the cable landing site and the respective offshore punchout location in nearshore waters.

Marine Research Consultants, Inc., (MRC) was contracted to conduct marine benthic surveys at each of the six cable landing sites. This report presents the results of the in-water survey of the HDD punchout areas for the Barbers Point site, located on the southwestern tip of O'ahu (Figure 1). The proposed HDD punchout points were surveyed in coordination with another potential subsea fiber optic cable project (O'ahu Subsea Cable Telecommunications Project), as the two projects are seeking to maximize the use of shared infrastructure. The survey results for the HDD punchouts are being reported for both projects as needed to provide the necessary documentation for project permitting purposes.

2 METHODS

2.1 GENERAL SURVEY METHODS

Marine biota surveys offshore of Barbers Point on the island of O'ahu were conducted on October 3-4, 2024; March 16 and 29, 2025; and July 3, 2025. Data was collected at the two proposed HDD punchouts and along the two proposed surface-laid cable routes for the HIFL Project (Figure 1, Table 1). The surveys were conducted by three marine biologists (S. Dollar, A. Millan, S. Peltier) using SCUBA working off a small boat.

During marine biota surveys, positioning data was recorded and sites were located using a handheld Global Position System (GPS) device (Garmin GPS Map79s or Trimble DA2). Divers collected representative photographs of all observed corals, non-coral invertebrates, fish, seagrass, and macroalgae as well as topographical and structural features and substrate type. All photographs were acquired using a digital mirrorless

camera (Sony A7R5) in an underwater housing (Nauticam). Species lists of all biota were tabulated from in situ observations as well as from review of photographs.

2.2 HDD PUNCHOUT SURVEYS

Two (2) proposed HDD punchout locations for the HIFL Project were provided to the dive team prior to the commencement of in-water surveys. At each of the HDD punchout locations, a weighted buoy attached to a surface float was deployed to mark the site and to provide a guideline for diver descent and ascent.

Divers surveyed the area within a radius of ~15 m around each HDD punchout for the presence of any macrobiota, particularly stony corals (Scleractinia) and seagrass (*Halophila* spp.). If such resources were present in the vicinity of the punchout site, divers surveyed nearby areas to identify regions that did not contain coral or seagrass. If no such area was identified, a location where these resources occurred in the lowest relative abundance was marked. If the HDD punchout location was relocated to a preferred alternative, the weight on the guideline was moved to the center of the new location. GPS coordinates for the new location were then recorded. Figure 1 shows the final HDD punchout location for both Site 1 and Site 2. Finally, divers surveyed the seafloor along a path 30 m offshore of the HDD punchout to evaluate whether biotic resources occurred along the route of the surface-laid cable. The HDD punchout sites were documented with one of two methods: photodocumentation or orthomosaic surveys. Orthomosaic surveys were conducted at Site 1 where hard bottom was present, and photo documentation surveys were conducted a Site 2 where a uniform bed of sand was present.

2.2.1 Orthomosaic Surveys

The seafloor at the northern HDD punchout location (Site 1) consisted of hard bottom composed of fossil reef limestone (Table 1, Figure 1). Orthomosaic imagery was used to document and analyze the physical and biotic composition of the benthic surface. An orthomosaic is created by using a suite of programming tools to combine multiple overlapping photographs into a single image. Orthomosaics are orthorectified to geometrically correct for perspective view, lens distortion, and camera angle to create an image covering a relatively large area with a uniform scale and no distortion. The orthomosaic product provides a level of detail and resolution that cannot be replicated with single photographs. As a result, orthomosaics provide a valuable tool for accurate ex situ analysis of undistorted two-dimensional benthic composition.

The orthomosaic at the HDD site covered an area of seafloor approximately 85 m^2. To delineate the boundaries and to provide scale to the final images, 30-cm-long bars marked with colored tape at 10-cm intervals were placed on the corners of the orthomosaic site. To collect photographs for the orthomosaic, divers equipped with digital cameras in underwater housings swam parallel lines (boustrophedonic pattern) above the seafloor over the entire marked area. Approximately 300 photographs were collected to construct the orthomosaic.

To construct the orthomosaic, individual photographs were initially processed using Adobe Bridge and Adobe Photoshop software. Agisoft Metashape Pro software was then used to combine all images to create a digital elevation model and output a seamless high-resolution orthomosaic. The orthomosaic was then color-corrected and cropped in Adobe Photoshop.

2.2.1.1 Percent Cover by Point Count Analysis

After the orthomosaic was constructed, a marine biologist analyzed the image to quantify percent cover of all biotic and abiotic benthic surface cover. Adobe Photoshop was used to place two hundred points in a grid pattern on the seafloor within the orthomosaic. The surface type underlying each point was classified as coral, other invertebrate, algae, or abiotic substrate. Classifications of biotic cover were made to the most specific level possible, typically to the species level. Points were tabulated and summarized using Microsoft Excel where the resulting data set provides percent cover of all surface types.

The seafloor offshore of Barbers Point is comprised of exposed hard substrate comprised of limestone fossil reef (LFR) as well as beds of calcareous sand. Exposed LFR is colonized by a range of macrobiota including corals, non-coral invertebrates, and algae. Limestone surfaces are primarily colonized by turf algae, which is comprised of small multi-species assemblages of algae and is a ubiquitous component of nearshore Hawaiian reefs. In benthic classification for this project, any immovable solid substrate that is not colonized by macrobiota is classified as LFR. Any material that is movable by typical ocean conditions is considered "Unconsolidated Substrate." Unconsolidated particles were classified according to a modification of the φ scale: Boulders >256 mm, Cobbles and gravel 2-256 mm, Sand <2mm.

2.2.1.2 Size-Class Frequency of Corals

Size-class frequency of corals was determined using ImageJ, a public domain Java image-processing program. Every coral colony within the orthomosaic was identified to the species level and numbered sequentially. The longest diameter of each colony was then measured and binned into one of the following size classes (in cm): 0 – 10, >10 – 20, >20 – 40. Results were tabulated using Microsoft Excel and provide a quantitative description of all corals at the three HDD punchout locations.

2.2.2 Photodocumentation Surveys

The southern HDD punchout site (Site 2) was comprised of a uniform bed of sand and was documented with representative photographs. Scale bars with markings indicating north were included in the photographs to show directional orientation in the images. Divers swam a radius of approximately 15 m to verify that the area did not include corals or seagrass.

2.3 SURFACE-LAID CABLE ROUTE

Divers conducted bounce dive photo surveys at 5 points (P1-P5) (Figure 1, Table 1). The purpose of these dives was to document the composition of the seafloor seaward of the HDD punchouts where the cable would be laid on the seafloor.

Table 1 Survey Type, Date of Survey, GPS Coordinates, and Water Depths for all Survey Locations

SITE NAME	SURVEY TYPE	DATE of SURVEY	LAT	LONG	DEPTH (m)
Site 1	OM	3/16/25	21.28792°	-158.11303°	16
Site 2	Photo	3/16/25	21.28319°	-158.10911°	22
P1	BD	7/3/25	21.287657°	-158.113283°	20
P2	BD	7/3/25	21.282948°	-158.109103°	24
P3	BD	7/3/25	21.279269°	-158.107121°	28
P4	BD	7/3/25	21.277613°	-158.105022°	27
P5	BD	7/3/25	21.274768°	-158.102209°	27

Note: P = Photodocumentation Survey; OM = Orthomosaic; Photo = standard photography; BD = bounce dive with standard photography; m = meters

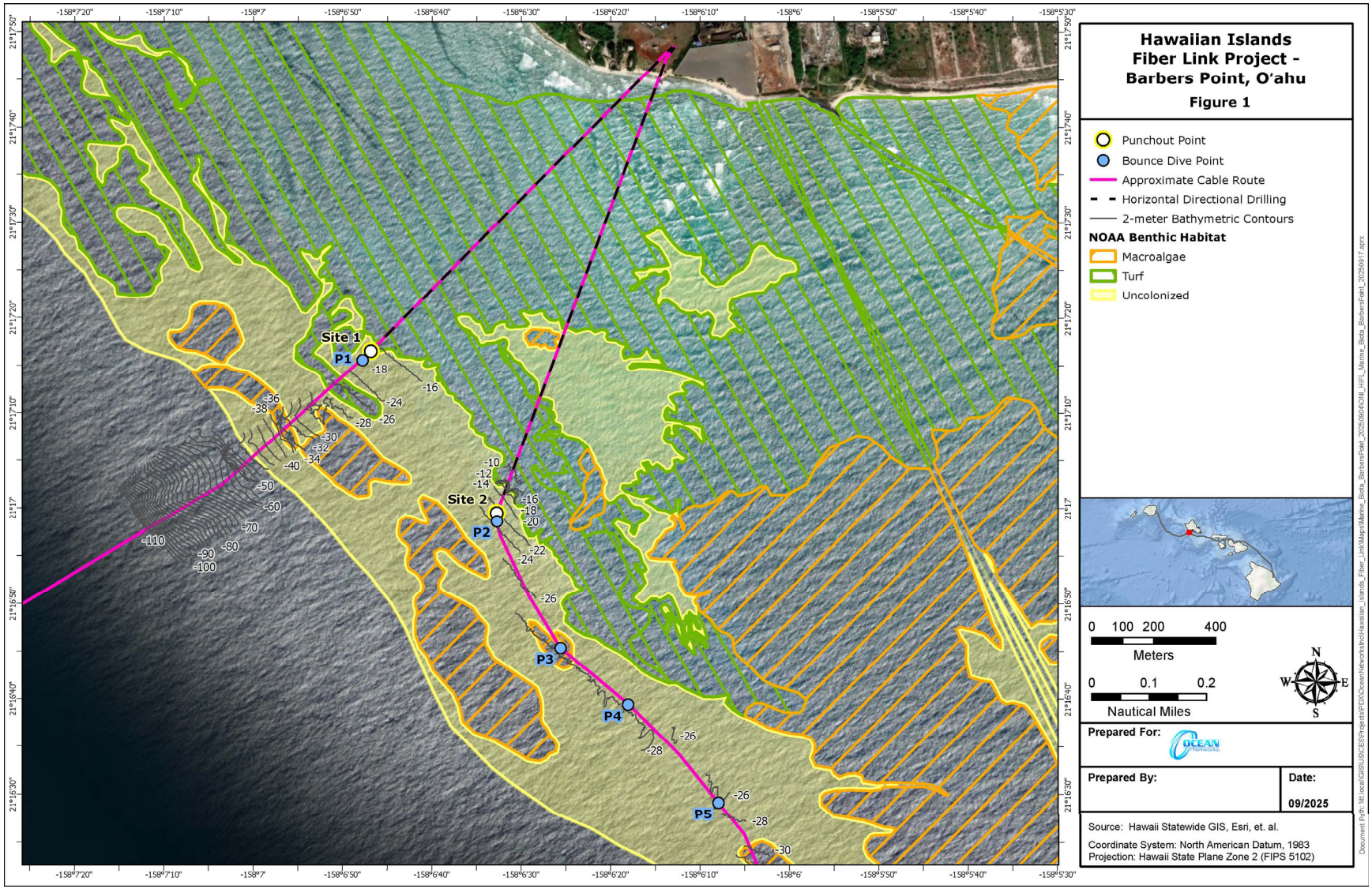


Figure 1 **Aerial Photograph of the Southeast Corner of Oahu Showing the Proposed HDD Punchouts at Site 1 and Site 2, Bounce Dive Points, Surface-Laid Cable Routes, and NOAA Benthic Habitat Data**

3 RESULTS

3.1 PHYSICAL STRUCTURE

In general, the physical structure of the marine habitat at Barbers Point extending from the shoreline seaward to the vicinity of the two HDD punchout points consists of a limestone fossil reef (LFR) platform interspersed with channels and sand pockets. The shallow reef platform terminates in a steep sloping face (approximately 45-60 degrees) that is the remnant feature of a former shoreline (Figure 2). The sloping reef face terminates in a junction with either a hard LFR platform or a bed of white sand. The top of the slope is on the order of 8-9 m of water depth, and the bottom edge is at a depth of approximately 15-17 m. The LFR platform grades into expanses of sand that extend seaward to depths beyond the limits of the present investigation.

3.2 HDD PUNCHOUT POINTS

Both HDD punchouts are located seaward of the reef slope. Site 1 is located on the LFR platform and Site 2 is within the sand bed (see Figure 1).

Prior to fieldwork in March 2025, investigators were supplied with a set of six geolocated points that represented potential locations for the HDD punchouts locations for both the HIFL project and the O'ahu Subsea Cable Telecommunications Project. Prior inspection of the three northern sites in the vicinity of Site 1 revealed that the area was colonized by extensive meadows of seagrass (*Halophila* sp.) (Figure 3). Consequently, these three punchout points were shifted north-northwest to locations where seagrass was not present. Specifically, Site 1 was relocated to provide a minimum distance of 15 m from any patches of seagrass as well as minimal presence of coral.

The seafloor at relocated HDD Punchout location for Site 1, shown in Figure 1, consisted of pockets of sand (35.5% of bottom cover) as well as emergent regions of LFR covered with turf algae (34.5% of bottom cover) (Table 3, Figure 4). *Udotea argentea*, which accounted for 24.0% of total bottom cover, was the most prevalent macroalgae at the site. Although too sparse to register in point count analysis, two colonies of *Pocillopora meandrina* (cauliflower coral) and five colonies of *Porites lobata* (lobe coral) were present at the site (Table 4). All but one of these corals were smaller than 20 cm in longest diameter.

The initial placement of the HDD punchout at Site 2 consisted primarily of a bed of sand containing scattered patches of mixed macroalgae and seagrass. Small areas of exposed LFR and loose rocks as well as some anthropogenic debris also occurred in the area (Figure 5). Site 2 was moved approximately 15 m offshore to an area clear of seagrass and coral for 15 m in all directions (Figure 6). The HDD punchout location at Site 2 is shown in Figure 1.

Seaward swims of the first 30 m of the surface-laid cable routes were conducted at each of the HDD punchout locations to assess the presence of seagrass or other resources. These surveys revealed expanses of white sand with no corals. Mixed macroalgae patches were present as well as several sparse patches of seagrass. It was not possible to locate two regions completely clear of seagrass at the two HDD punchout points and 30 m seawards of these HDD punchouts. However, the two locations that were chosen were populated with the lowest quantity of seagrass within the region chosen for the cable alignments.

3.3 SEAFLOOR ALONG SURFACE-LAID CABLE ROUTE

Bounce dives at five locations along the surface-laid cable routes provided information on the composition of the seafloor seaward of the punchouts (Figure 7 to Figure 10). Inspection of the seafloor at P1 along the surface-laid cable route for Site 1 and P2 and P3 along the surface-laid cable route for Site 2 revealed dense aggregations of mixed macroalgae along with seagrass (Figure 7 to Figure 9). Macroalgae and seagrass were not present on the sand surface along the surface-laid cable route for Site 2 at P4 and P5 (Figure 10).

3.4 SPECIES PRESENT

Table 2 lists all species of corals, non-coral invertebrates, and macroalgae observed in the vicinity of the HDD punchout locations. Not all the organisms listed were within the 15 m radius of the two HIFL HDD punchout locations; however, they can be considered representative of the area overall.

Three species of stony (scleractinian) corals were observed near Site 1: *Montipora capitata* (rice coral), *P. meandrina*, and *P. lobata* (Table 2). The only species of coral observed near the Site 2 was a single colony of *P. meandrina*, which was found on what appeared to be a small pile of logs or some other form of anthropogenic debris (Figure 5).

Four species of non-coral invertebrates were observed in the vicinity of the HDD punchout locations (Table 2). Non-coral invertebrates were more common near Site 1 owing to hard substrate for the organisms to shelter in and around as compared to the sand beds that comprised the environment at Site 2. Two species of urchins were detected near Site 1, while two snails were detected near Site 2.

Thirty-five (35) species of fish within 15 families were observed during the marine biota surveys conducted offshore of Barbers Point, O'ahu (Table 5, Figure 11). Mixed schools of fish congregated on coral heads on the ledges shoreward of the HDD punchout points (Figure 11 A and B). On the flat plains of sand and hard bottom, fish sheltered in holes in the reef or buried themselves in the sand when approached (Figure 11 C and D). When considering all families, Labridae (wrasses) were comprised of the greatest number of species (6), followed by Acanthuridae (Surgeonfishes, 5 species), and Chaetodontidae (butterflyfishes, 4 species). All other families were represented by three

of fewer species. The four species of fish classified as abundant during surveys at Barbers Point were *Canthigaster jactator* (Hawaiian whitespotted toby), *Paracirrhites arcatus* (arceye hawkfish), *Pycnochromis vanderbilti* (blackfin chromis), and *Thalassoma duperrey* (saddle wrasse).

4 SUMMARY

In summary, two HIFL HDD punchout sites have been positioned in locations offshore of Barbers Point in areas where the composition of the ocean floor consists of flat limestone pavement or sandy substrate. These sites were surveyed in coordination with other proposed HDD sites for the O'ahu Subsea Cable Telecommunications Project, as the two projects are seeking to maximize the use of shared infrastructure. During diver inspections, the HDD punchout points were moved to areas that did not contain dense beds of seagrass or aggregations of stony corals. The HDD punchout points are in water depths of 16-22 m.

Inshore of the HDD punchout points, bottom composition consists of mostly barren limestone fossil reef interspersed with sand channels. The reef flat grades into the steep sloping ledge of the remnants of a former shoreline. The sloping ledge terminates in a junction with a hard LFR platform that grades into a sand plain. Punchout points were located seaward of the sloping ledge. The HDD punchout for Site 1 is located on the hard platform while the HDD punchout for Site 2 is within an expanse of sand. The benthic habitat seaward of the HDD punchout for Site 1 consists of sand plains populated with dense aggregations of macroalgae and seagrass. The benthic habitat seaward of the HDD punchout for Site 2 consists of sand plains that contained far less coverage of algae and seagrass. At the farthest extent of dive surveys off of Site 2, there was no seagrass present. Laying the fiber optic cable through these areas by divers could be accomplished in a manner to avoid or minimize contact with seagrass. If contact with seagrass is unavoidable, the impacts would be temporary, and the species would be expected to recover naturally. The passage of a fiber optic cable over the surface should not result in any significant impact to marine resources.

Table 2 All Species of Coral, Non-Coral Invertebrates, and Macroalgae Observed During Surveys at Barbers Point, O'ahu

CATEGORY	SPECIES NAME	COMMON NAME	HDD PUNCH-OUT SITE	
			SITE 1	SITE 2
CORAL	*Montipora capitata*	Rice coral	X	-
	Pocillopora meandrina	Cauliflower coral	X	X
	Porites lobata	Lobe coral	X	-
OTHER INVERTS	*Conus textile*	Textile cone shell	-	X
	Diadema savignyi	Blue-lined long-spine urchin	X	-
	Mitra papalis	Papal miter	-	X
	Tripneustes gratilla	Collector urchin	X	-
ALGAE	*Avrainvillea lacerata*	Leather mudweed	X	-
	Halimeda discoidea	Rosette halimeda	X	-
	Halimeda opuntia	Prickly pear seaweed	X	-
	Hydrolithon onkodes	Encrusting coralline algae	X	-
	Neomeris spp.	Finger seaweed	X	-
	Sarcinochrysis marina	Golden sacs algae	X	-
	Sporolithon erythraeum	Patchy red coralline algae	X	-
	Udotea argentea	Udotea	X	-
SEAGRASS	*Halophila* spp.	Seagrass	X	X

NOTE: This list represents species presence in the vicinity of each punchout site. All resources (corals) detected within ~5m of the punchout point are shown in Table 4.

Table 3 Point Count Analysis Showing Percent Cover of all Bottom Types in the Orthomosaic Constructed at Site 1

CATEGORY	SPECIES	PERCENT (%) COVER
ALGAE	Cyanobacteria	2.0
	Udotea argentea	24.0
	Mixed macroalgae	2.0
	TOTAL ALGAE	**28.0**
SPONGE	*Spheciospongia vagabunda*	1.0
	Sponge (other)	0.5
	TOTAL SPONGE	**1.5**
ABIOTIC SUBSTRATE	Limestone Fossil Reef (LFR with turf algae)	34.5
	Cobbles/Gravel	0.5
	Sand	35.5
	TOTAL ABIOTIC SUBSTRATE	**70.5**

Table 4 Size-Class Frequency Analysis of Corals in the Orthomosaic Constructed at Site 1

SPECIES	SIZE CLASS (cm)	SITE
		SITE 1
Pocillopora meandrina	>0 – 5	1
	>20 – 40	1
	TOTAL	**2**
Porites lobata	>5 – 10	4
	>10 – 20	1
	TOTAL	**5**
ALL CORALS	>0 – 5	1
	>5 – 10	4
	>10 – 20	1
	>20 – 40	1
	TOTAL	**7**

Table 5 All Species of Fish Observed During Surveys at Barbers Point, O'ahu

FAMILY - SPECIES	COMMON NAME	ABUNDANCE
Acanthuridae (Surgeonfishes)		
Acanthurus blochii	Ringtail surgeonfish	R
Acanthurus nigrofuscus	Brown tang	C
Acanthurus olivaceus	Orangeband surgeonfish	R
Ctenochaetus strigosus	Goldring surgeonfish	C
Zebrasoma flavescens	Yellow tang	C
Apogonidae (Cardinalfishes)		
Pristiapogon kallopterus	Iridescent cardinalfish	R
Balistidae (Triggerfishes)		
Melichthys vidua	Pinktail durgon	C
Sufflamen bursa	Lei triggerfish	C
Blenniidae (Blennies)		
Plagiotremus ewawensis	Ewa fang blenny	R
Carangidae (Jacks)		
Decapterus macarellus	Mackerel scad	R
Chaetodontidae (Butterflyfishes)		
Chaetodon kleinii	Blacklip butterflyfish	R
Chaetodon multicinctus	Multiband butterflyfish	R
Chaetodon quadrimaculatus	Fourspot butterflyfish	R
Heniochus diphreutes	Pennant butterflyfish	R
Cirrhitidae (Hawkfishes)		
Cirrhitops fasciatus	Redbarred hawkfish	R
Paracirrhites arcatus	Arceye hawkfish	A
Labridae (Wrasses)		
Iniistius pavo	Peacock razorfish	R
Labroides phthirophagus	Hawaiian cleaner wrasse	C
Oxycheilinus unifasciatus	Ringtail wrasse	R
Pseudocheilinus evanidus	Chinstrap wrasse	R
Stethojulis balteata	Belted wrasse	R
Thalassoma duperrey	Saddle wrasse	A
Lutjanidae (Snapper)		
Lutjanus kasmira	Bluestripe snapper	C
Mullidae (Goatfishes)		
Parupeneus insularis	Doublebar goatfish	C
Parupeneus multifasciatus	Manybar goatfish	C
Parupeneus pleurostigma	Sidespot goatfish	R
Muraenidae (Eels)		
Echidna nebulosa	Snowflake moray	R
Gymnothorax eurostus	Stout moray	R
Gymnothorax undulatus	Undulated moray	R
Pomocentridae (Damselfishes)		
Dascyllus albisella	Hawaiian dascyllus	C
Plectroglyphidodon imparipennis	Brighteye damselfish	C
Pycnochromis vanderbilti	Blackfin chromis	A
Scorpaenidae (Scorpionfishes)		
Sebastapistes ballieui	Spotfin scorpionfish	R
Tetraodontidae (Pufferfishes)		
Canthigaster jactator	Hawaiian whitespotted toby	A
Zanclidae (Moorish Idol)		
Zanclus cornutus	Moorish idol	C
TOTAL # of SPECIES	**35**	

NOTE: A, C, and R indicate relative abundance observed during the surveys at Barbers Point. A = Abundant, C = Common, and R = Rare.

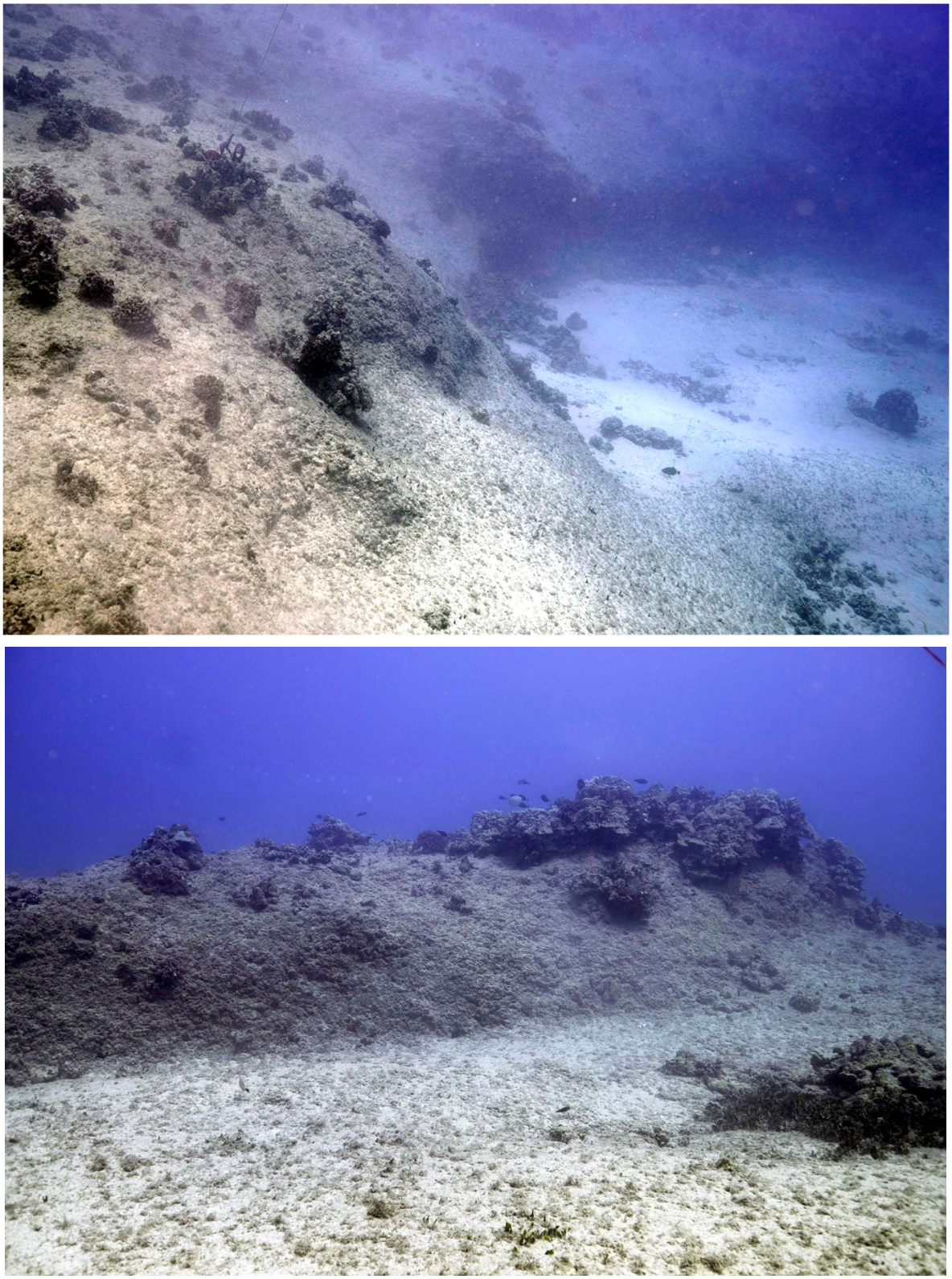


Figure 2 Former Shoreline Slope ~60 m Inshore of HDD Punchout for Site 2

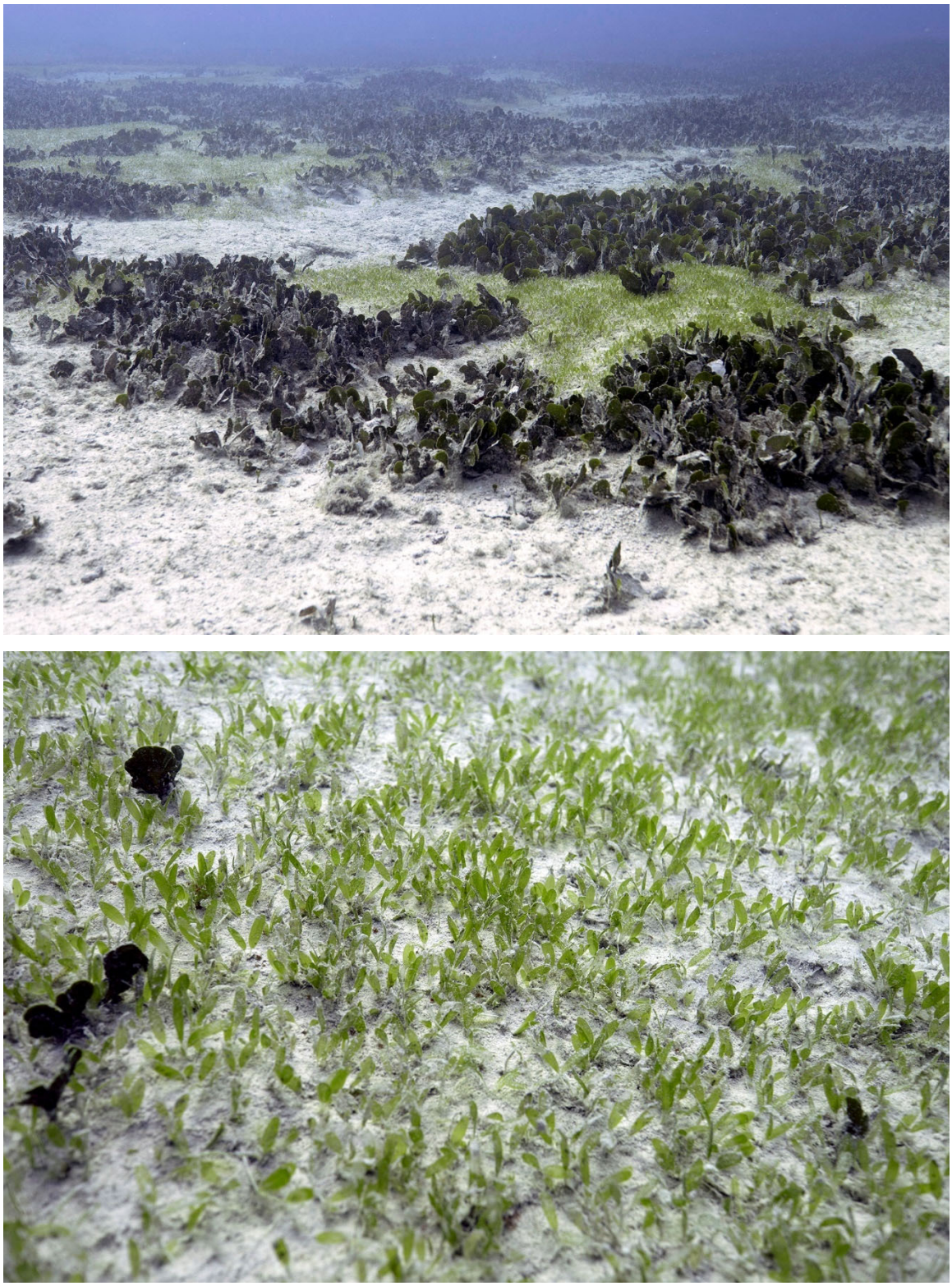


Figure 3 **Mixed Macroalgae and Seagrass (*Halophila* sp.) near Originally Proposed HDD Punchout for Site 1**

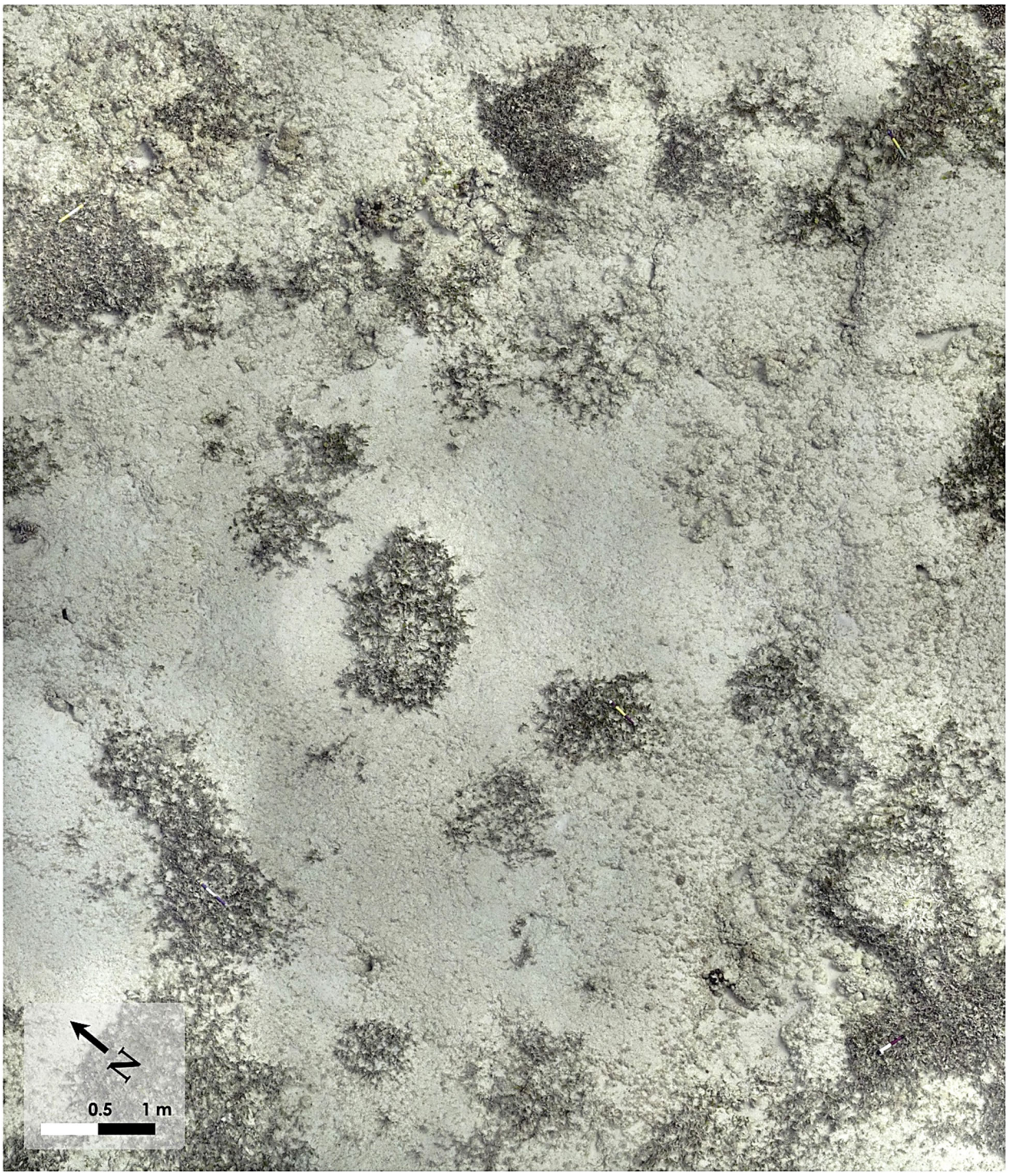


Figure 4 Orthomosaic Constructed at HDD Site 1



Figure 5 ***Pocillopora meandrina*** **(cauliflower coral) Growing on Anthropogenic Debris North of Site 2**

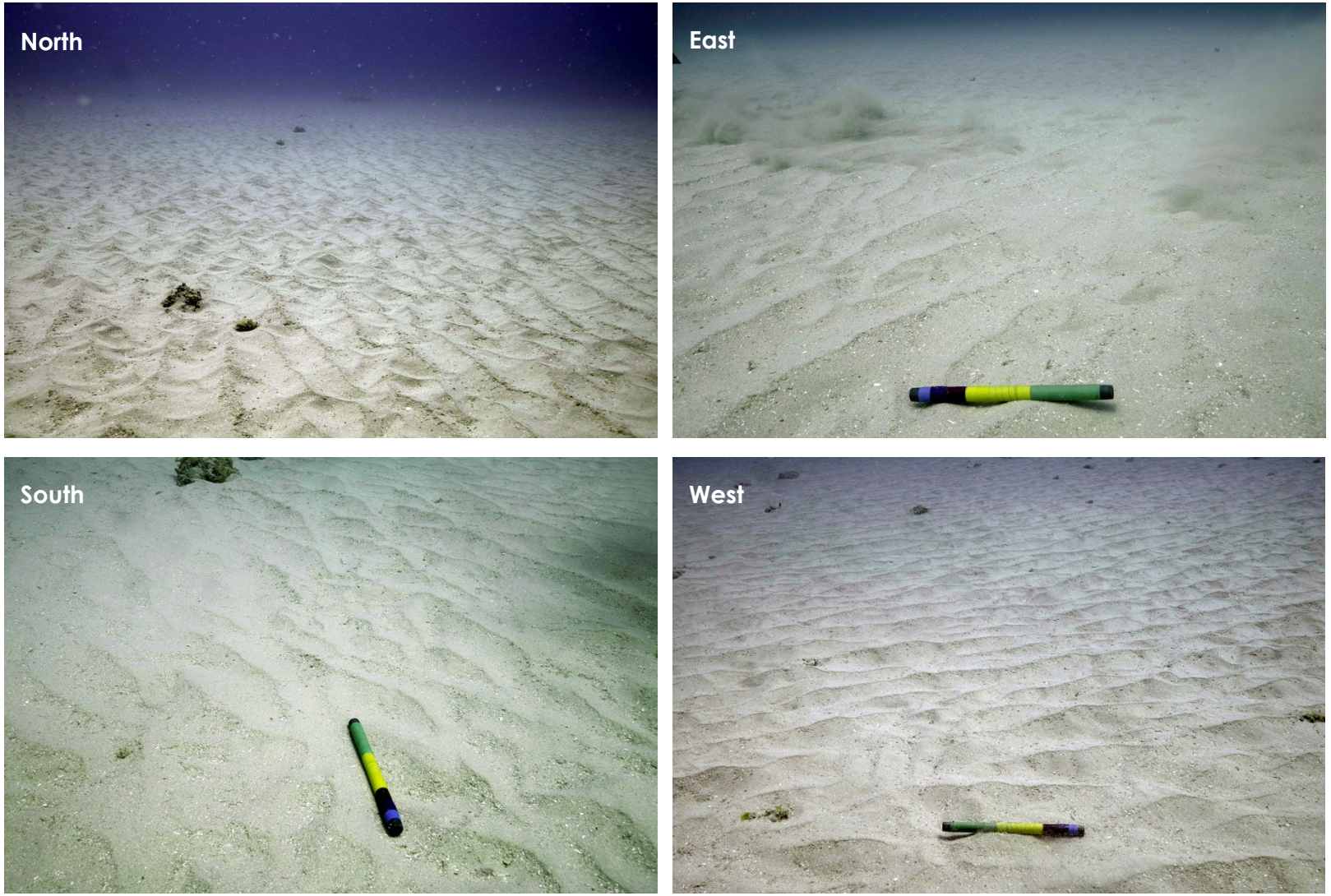


Figure 6 Four Views of Sandy Seafloor at HDD Punchout for Site 2

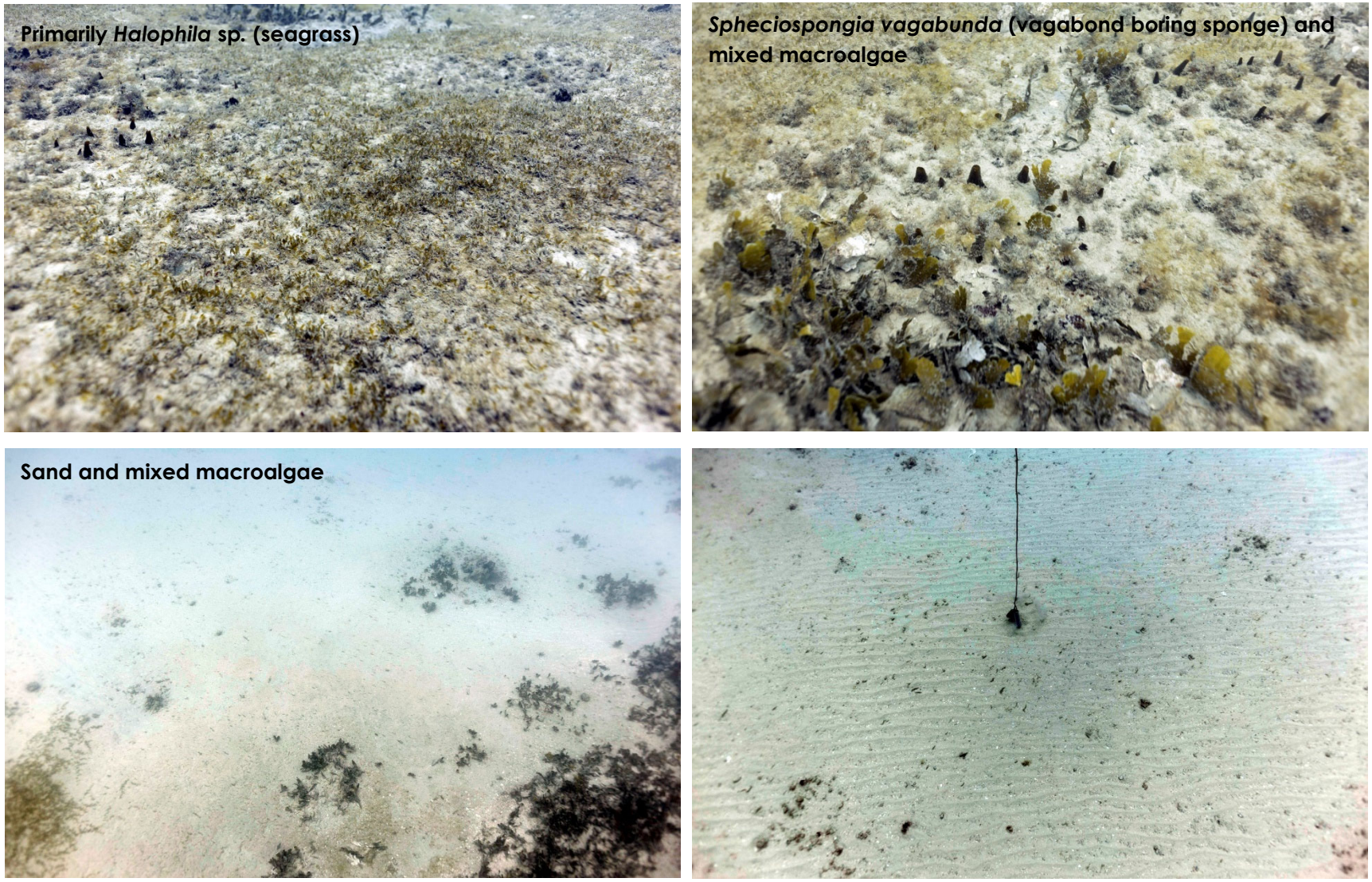


Figure 7 Representative Images at P1

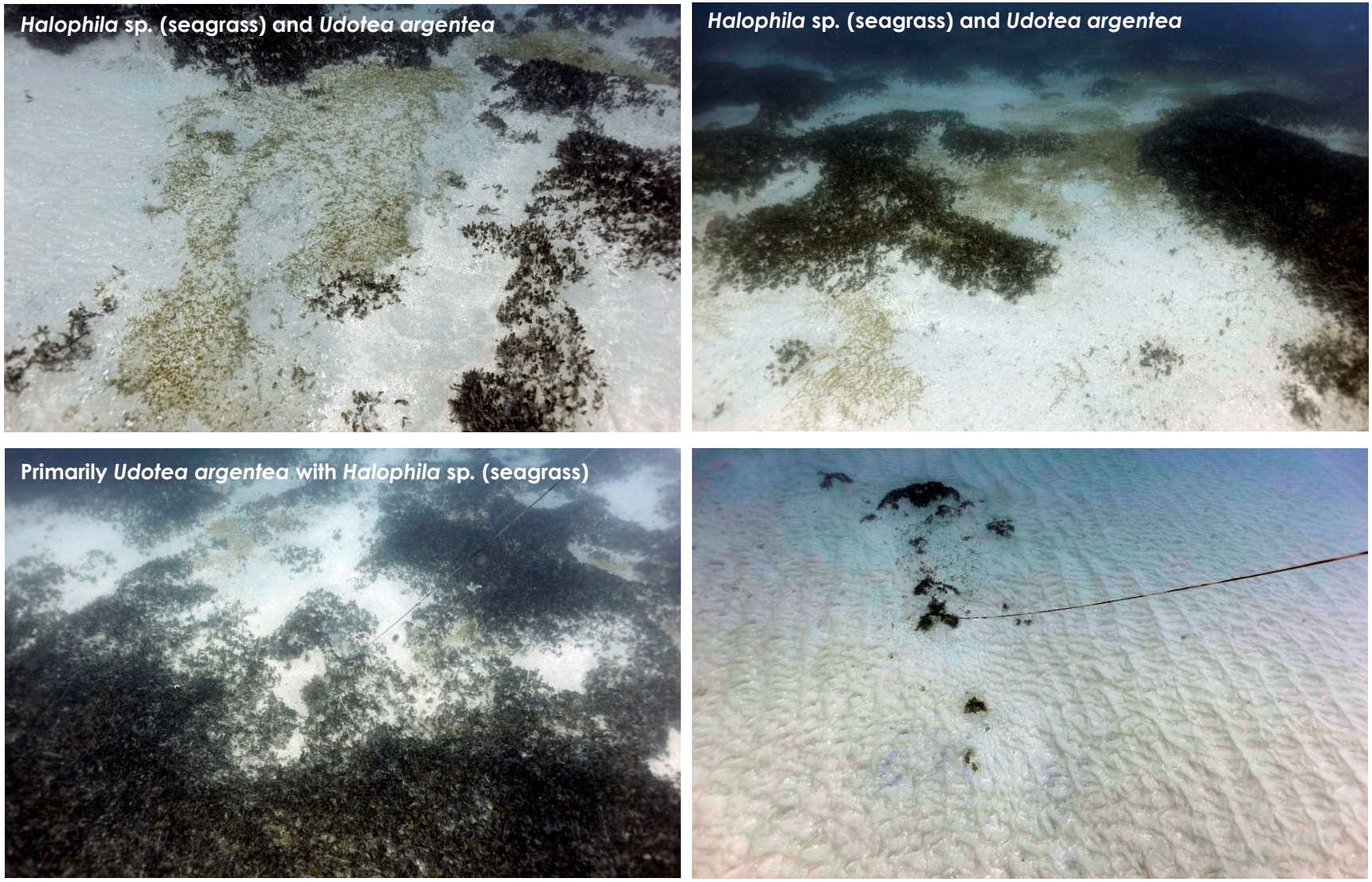


Figure 8 Representative Images at P2

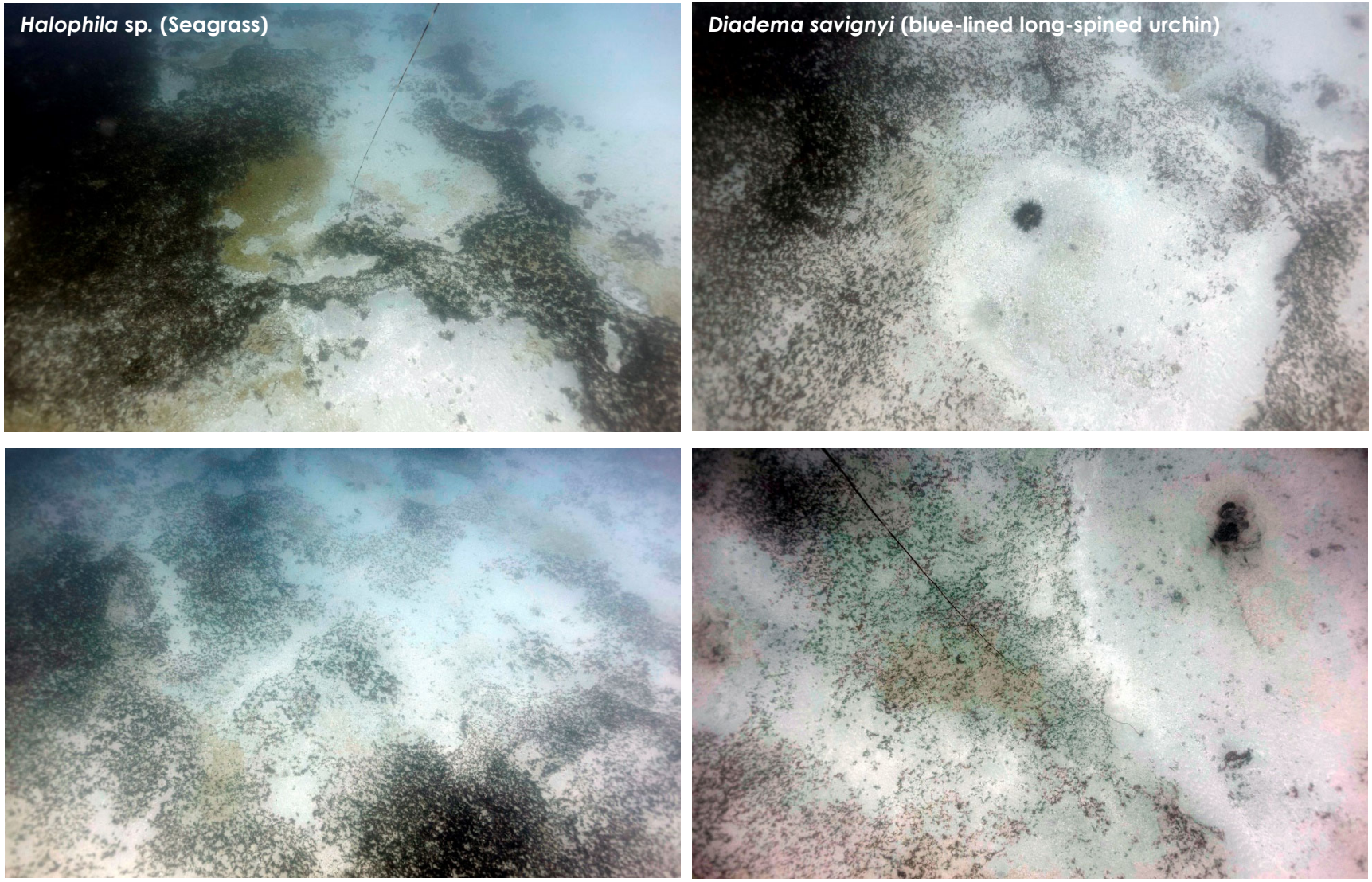


Figure 9 Representative Images at P3

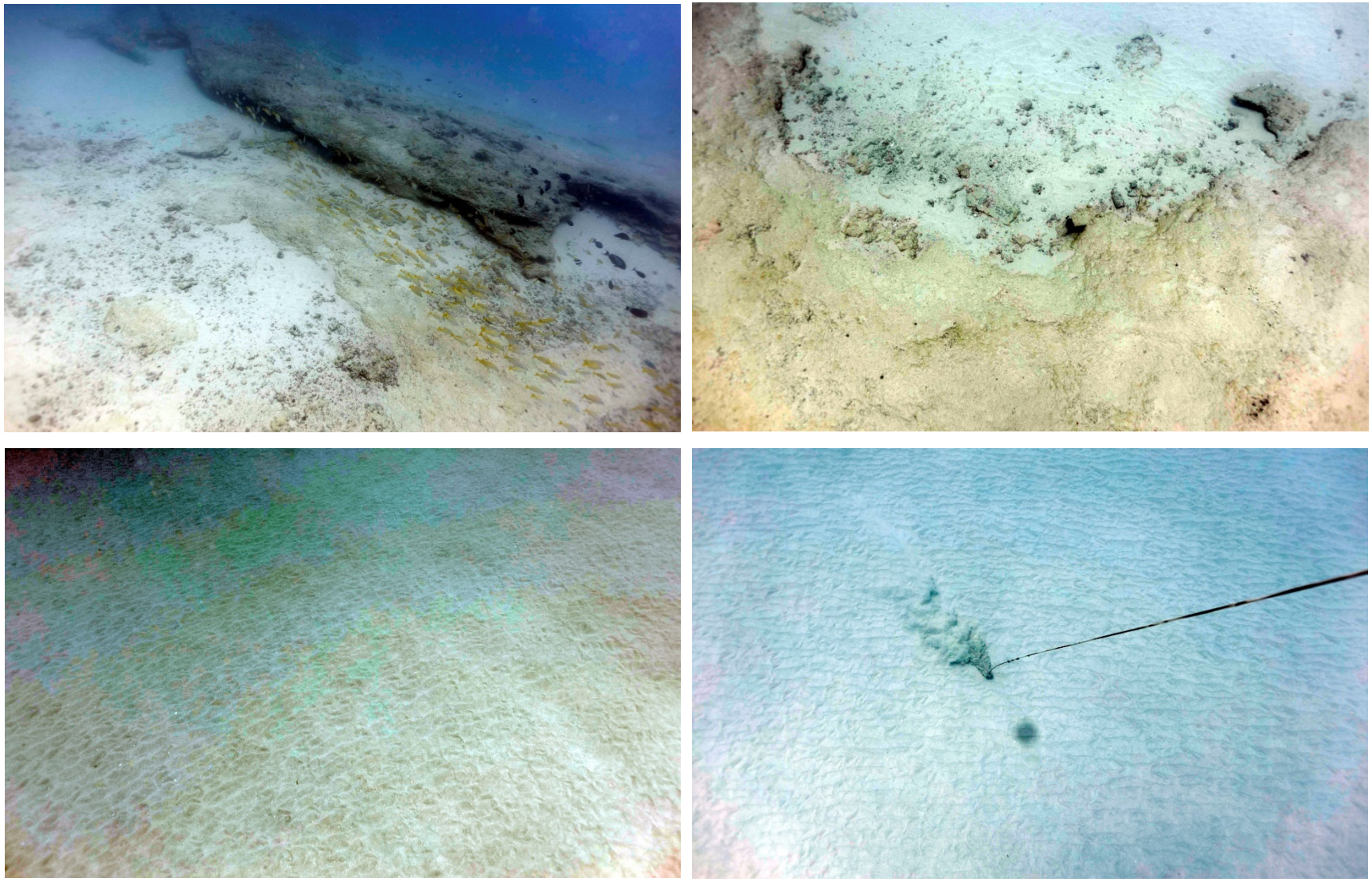
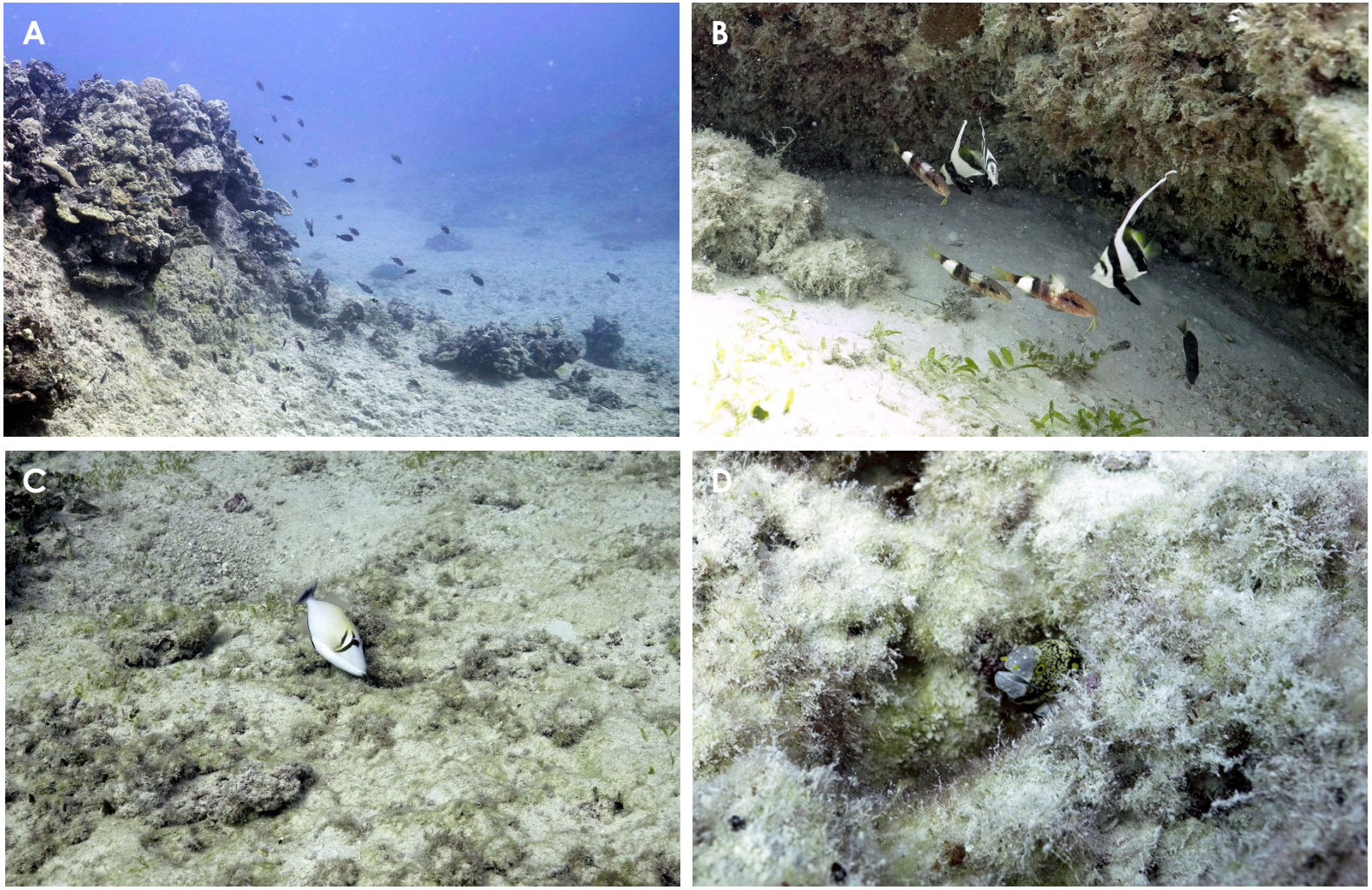


Figure 10 Representative Images at P4 (Top) and P5 (Bottom)

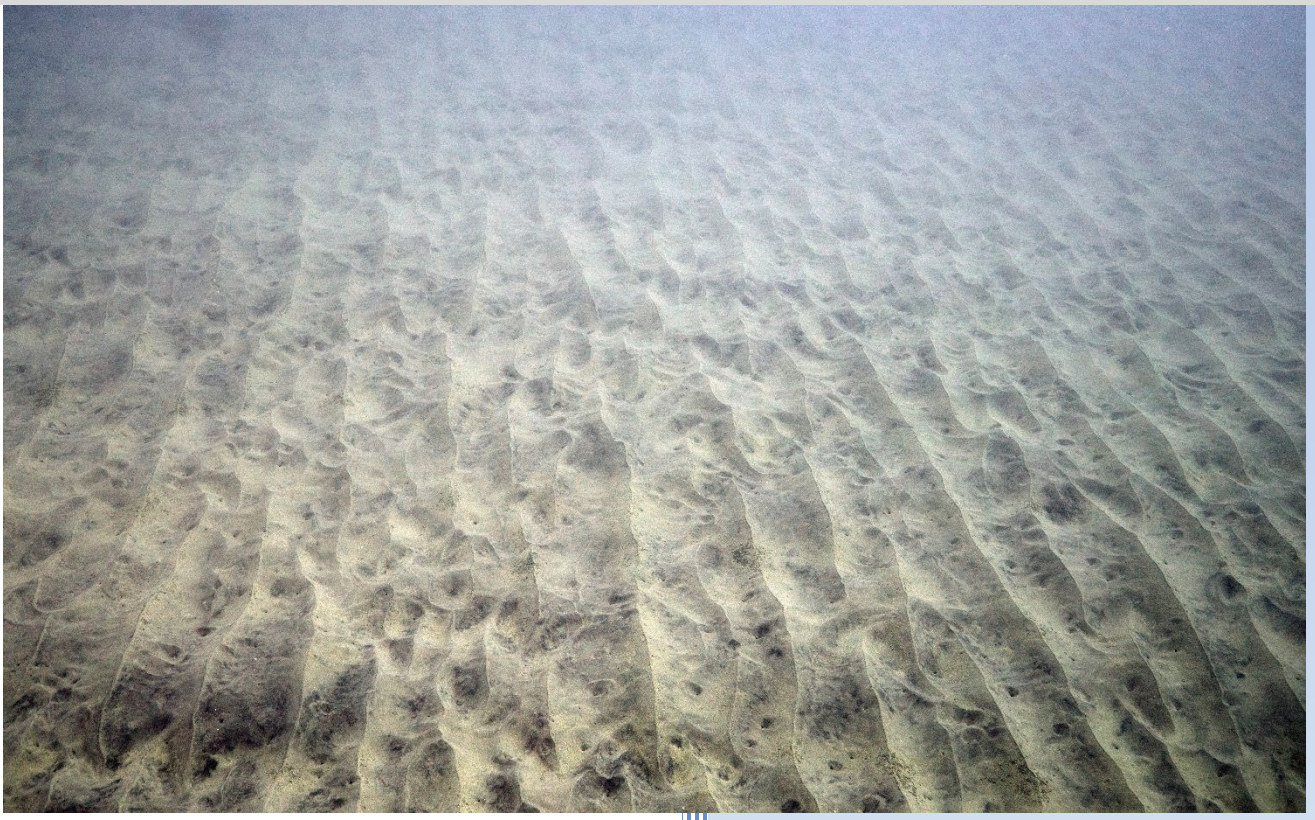


NOTES: A – Mixed school of fish along ledge north of HDD Punchout HIFL1; B – *Heniochus diphreutes* (pennant butterflyfish) and *Parupeneus multifasciatus* (manybar goatfish) south of Site 1; C – *Sufflamen bursa* (lei triggerfish) north of Site 2; and D – *Echidna nebulosa* (snowflake eel) near Site 1

Figure 11 Representative Images of Fish

MARINE RESEARCH CONSULTANTS, INC.

Marine Biota Survey – Hawaiian Island Fiber Link Project Kahului, Maui, Hawai‘i



SUBMITTED TO:
Ocean Networks, INC (ONI)
And TetraTech

PREPARED BY:
Marine Research Consultants, Inc.
46-312C Haiku Rd
Kaneohe, HI 96744
808-779-4009

DATE: July 28, 2025

TABLE OF CONTENTS

1 INTRODUCTION 1

2 METHODS 1

3 RESULTS 4

3.1 PHYSICAL STRUCTURE 4

3.2 BIOTA 4

4 SUMMARY 5

List of Figures

Figure 1 Aerial Photograph of Marine Area Offshore of Kahului Showing the HIFL Punchout Point and Proposed Cable Routes 3

Figure 2 East 1 (Potential Punchout Point) – Sandy Ocean Floor at (Depth ~10 m) 6

Figure 3 East 2 – Sandy Ocean Floor (Depth ~9 m) 6

Figure 4 East 3 – Hard Substrate and Rocks with Turf Algae and Macroalgae on Sandy Ocean Floor (Depth ~16 m) 7

Figure 5 East 3 – Rocks with Turf Algae (lower left corner) and Sandy Ocean Floor at (Depth ~16 m) 7

Figure 6 East 4 – Patch of Hard Substrate (~ 30 cm in diameter) with Turf Algae on Sandy Ocean Floor (Depth ~19 m) 8

Figure 7 East 5 – Sandy Ocean Floor at (Depth ~23 m) 8

Figure 8 East 6 – Sandy Ocean Floor (depth ~26 m) 9

Figure 9 West 1 (Potential Punchout Point) – Sandy Ocean Floor (Depth ~10 m) 9

Figure 10 West 2 – Sandy Ocean Floor (Depth ~9 m) 10

Figure 11 West 3 – Sandy Ocean Floor (Depth ~12 m) 10

Figure 12 West 3 – School of Juvenile *Caranx melampygus* (Giant trevally) in the Water Column 11

Figure 13 East 5 – *Pelagia noctiluca* (Mauve stinger) in the Water Column 11

List of Tables

Table 1 GPS Coordinates for all Survey Points 2

Table 2 All Species of Invertebrates, Macroalgae, and Fish Observed During Marine Biota Surveys at Kahului 5

1 INTRODUCTION

The State of Hawai'i, represented by the University of Hawai'i (UH) Vice President for Information Technology and Chief Information Officer, is proposing the Hawaiian Islands Fiber Link (HIFL) Project. HIFL is an interisland submarine fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the state. To assist with obtaining the necessary permits for the project, UH has engaged Ocean Networks Inc. (ONI), a private company specializing in the development, operation, and maintenance of submarine fiber optic cables.

The proposed project involves construction, operation, and maintenance of an interisland subsea fiber optic cable system with cable landing sites strategically located on Kaua'i (Nukoli'i Beach), O'ahu (Barbers Point), Maui (Kahului Harbor), Moloka'i (Moloka'i Yacht Club), Lāna'i (Mānele Harbor), and Hawai'i Island (Pacific Aquaculture & Coastal Resource Center, Hilo). The cable, which would have a maximum diameter of approximately 1.5 inches, would be surface laid on the seabed within state and U.S. federal waters to interconnect these sites. At all six cable landing sites, horizontal directional drilling (HDD) would be used to traverse underneath the shoreline to respective offshore punchout locations in the nearshore waters.

Marine Research Consultants, Inc., (MRCI) was contracted by ONI to conduct marine benthic surveys at each of the six cable landing sites. The Kahului site, located on the northern side of the island of Maui, includes two proposed HDD punchout locations. This report presents the results of the in-water survey associated with these proposed HDD punchout locations and associated cable routes.

2 METHODS

Surveys of the seafloor offshore of Kahului Harbor for the HIFL project included two potential HDD punchout locations (West and East) as well as 7 sites spaced along two potential surface-laid cable routes (Figure 1, Table 1). Sites were chosen based on drop camera images and side scan data that indicated the potential for hard substrate, which could support the settlement and growth of corals. Surveys were conducted on December 16, 2024 (Figure 1). The marine biota assessment survey was conducted by two marine biologists (S. Dollar and A. Millan) using SCUBA working from a small boat.

A handheld Global Position System (GPS) device (Garmin GPSMap79s) was used to navigate to the coordinates of the proposed survey locations where a weighted buoy was deployed to mark the site (Table 1). Divers carried underwater slates and digital mirrorless cameras in underwater housings and descended the buoy line to the punchout location. Divers surveyed the area within a 10 meter- (m-) radius centered at each dive location. At each location divers photographed all observed invertebrates,

fish, and macroalgae species as well as topographical and structural features and substrate type. Species lists were tabulated for all biota observed in situ as well as from review of photographs.

Table 1 GPS Coordinates for all Survey Points

NAME	LATITUDE	LONGITUDE
East 1 – Punchout point	20.90425	-156.471567
East 2 – Cable route	20.90551	-156.47015
East 3 – Cable route	20.90679	-156.46876
East 4 – Cable route	20.90818	-156.46723
East 5 – Cable route	20.91017	-156.46490
East 6 – Cable route	20.91282	-156.46157
West 1 – Punchout point	20.90150	-156.47732
West 2 – Cable route	20.90237	-156.47706
West 3 – Cable route	20.90471	-156.47640

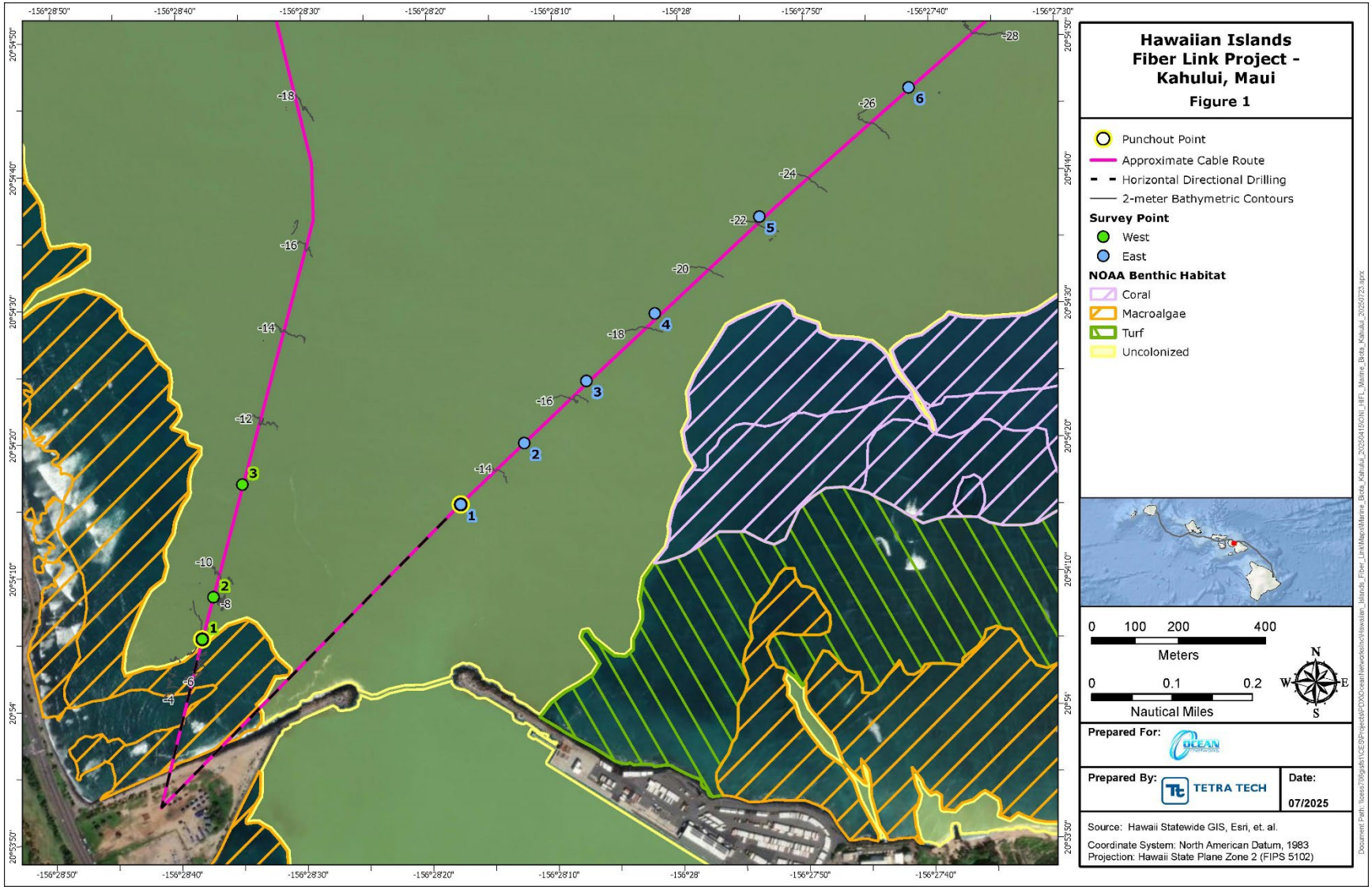


Figure 1 Aerial Photograph of Marine Area Offshore of Kahului Showing the HIFL Punchout Point and Proposed Cable Routes

3 RESULTS

3.1 PHYSICAL STRUCTURE

The seafloor at the two proposed HDD punchout points as well as along the surface-laid cable route consisted primarily of large sand beds that did not contain any channels or other dominant physical features (Figure 2 through Figure 11). Sand waves in various sizes and formations were present at all sites. The seafloor adjacent to the north side of survey point East 3 included patches of hard substrate as well as rocks on sand beds (Figure 4 and Figure 5). A single patch of hard bottom approximately 20 centimeters (cm) in diameter was present at survey point East 4 (Figure 6).

As the entire area consists of extensive beds of sand, it is likely that the area serves as a sand sink from westward flowing currents driven primarily by northeast tradewinds. As a result, the steady accumulation of sand prevents the formation of solid reef structure.

3.2 BIOTA

As the entire survey area is relatively homogeneous and did not include multiple distinct habitats, biologists compiled a single list of all species observed at the ten survey sites (Table 2). No sensitive marine resources such as *Halophila* spp. (seagrass) or corals were observed at any of the survey sites. Overall, macrobiota were extremely sparse across all ten sites.

Five species or species groups of invertebrates were observed during the surveys including four benthic (bottom dwelling) organisms and one pelagic species. The benthic organisms consisted of sponges, a sea cucumber, and a tube worm, all of which are commonly found in nearshore Hawaiian waters. *Pelagia noctiluca* (jellyfish, mauve stinger), which is not typically found in Hawaiian nearshore waters, was the sole pelagic invertebrate observed during the survey (Figure 13).

Eight species or species groups of macroalgae were observed during the surveys (Table 2). However, turf algae was the dominant algal component as well as the dominant macrobiotic component of all available hard substrate at all dive locations. Turf algae is made up of small multi-species assemblages of algae and is a ubiquitous component of nearshore Hawaiian reefs.

In total, four species of fish were observed during the surveys (Table 2). A large school (~200 individuals) of juvenile *Caranx melampygus* (giant trevally, known locally as papio) were swimming in a circular pattern in the water column at West 3 (Figure 12). *Chaetodon miliaris* (milletseed butterflyfish), *Lutjanus fulvus* (blacktail snapper), and *Parupeneus multifasciatus* (manybar goatfish) comprised the remaining three species of fish and are all commonly observed in nearshore Hawaiian waters.

Table 2 All Species of Invertebrates, Macroalgae, and Fish Observed During Marine Biota Surveys at Kahului

CATEGORY	SPECIES	COMMON NAME
INVERTEBRATES	*Holothuria atra*	Black sea cucumber
	Pelagia noctiluca	Mauve stinger
	Porifera	Sponge
	Tethya sp.	Globe sponge
	Thelepus setosus	Brown tube worm
ALGAE	*Acanthophora pacifica*	Pacific seaweed
	Bryopsis pennata	Sea fern
	Cyanobacteria	Blue-green algae
	Gracilaria coronopifolia	Limu maunauea (ogo)
	Halimeda kanaloana	Kanaloa's halimeda
	Halymenia sp.	Cock's comb seaweed
	Laurencia sp.	Laurencia seaweed
	Portieria hornemannii	Hornemann's seaweed
FISH	*Caranx melampygus*	Bluefin trevally
	Chaetodon miliaris	Milletseed butterflyfish
	Lutjanus fulvus	Blacktail snapper
	Parupeneus multifasciatus	Manybar goatfish

4 SUMMARY

Surveys of the two potential punchout points and surface-laid cable routes offshore of Kahului Harbor, Maui, were conducted in December 2024. Nine points were surveyed including the two proposed punchout locations and 7 points along the proposed surface-laid cable routes. Bottom composition at all nine sites consisted almost entirely of extensive beds of sand with no corals, seagrass, or other sensitive resources.

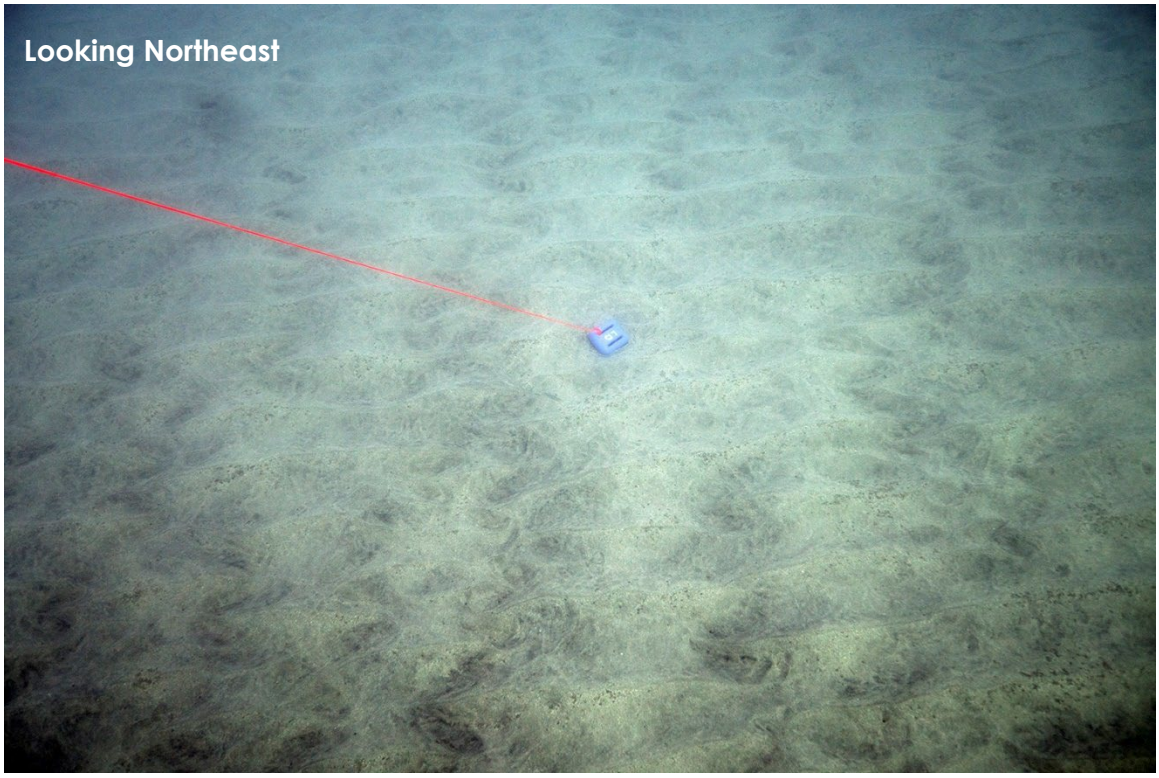


Figure 2 East 1 (Potential Punchout Point) – Sandy Ocean Floor at (Depth ~10 m)

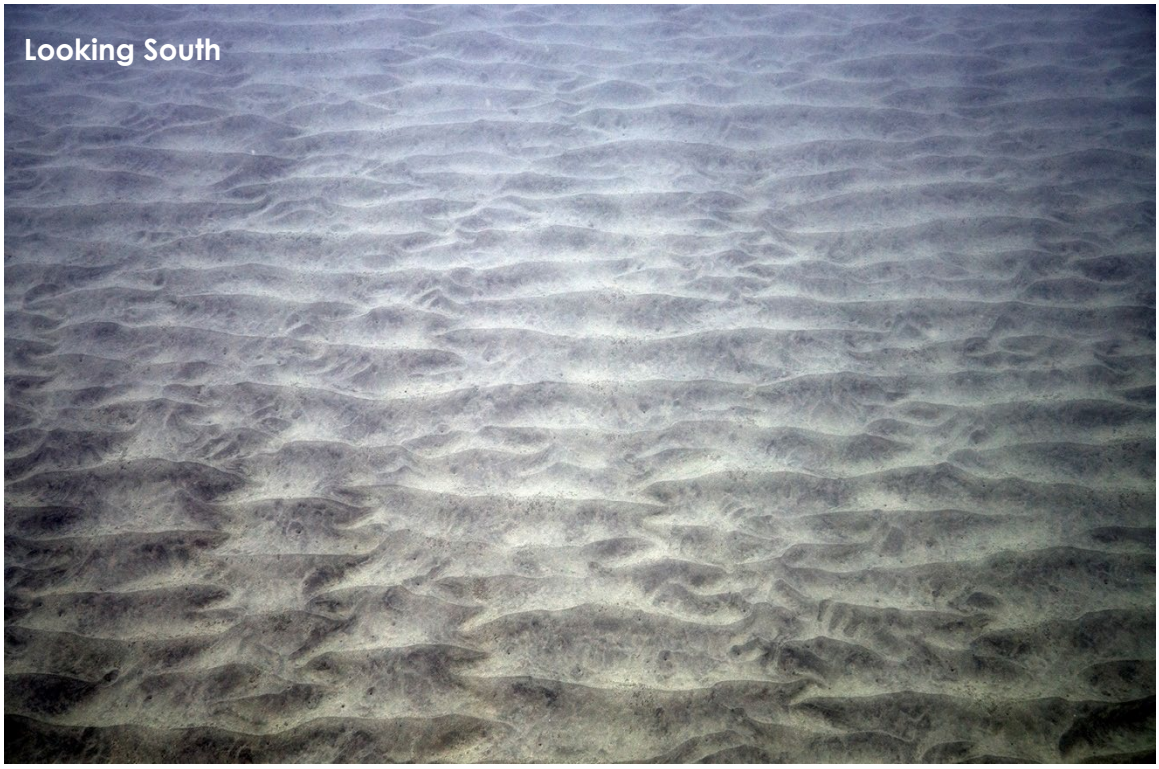


Figure 3 East 2 – Sandy Ocean Floor (Depth ~9 m)

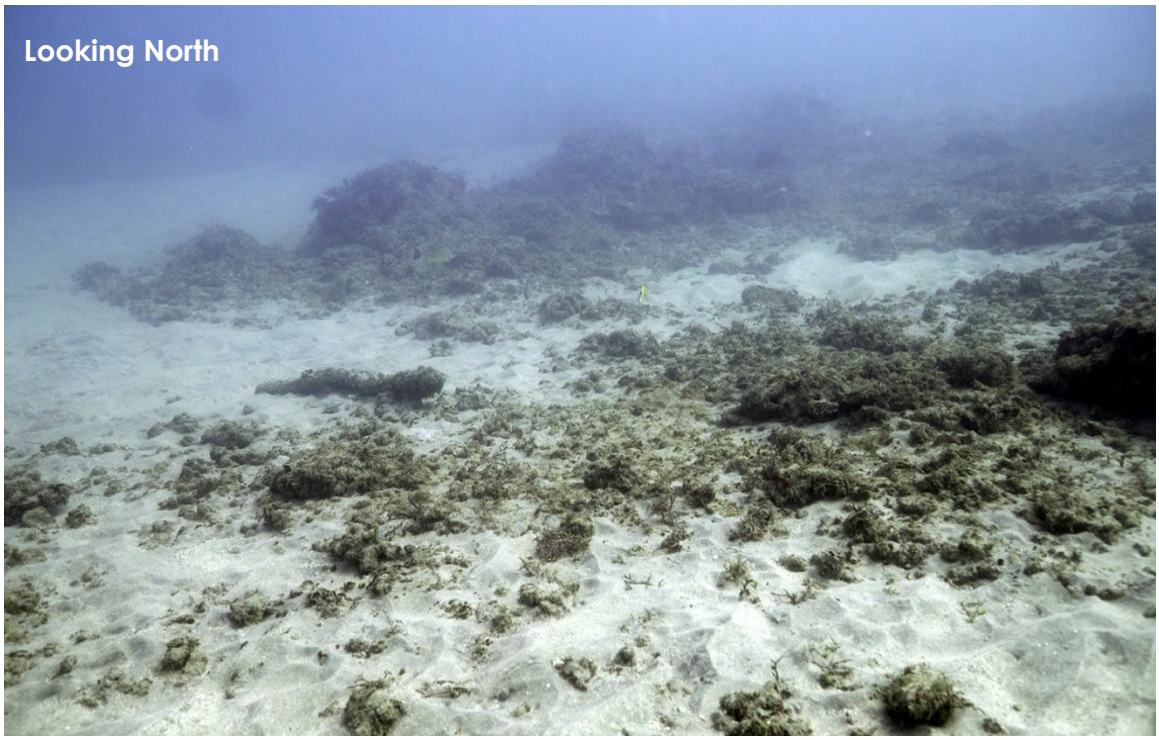


Figure 4 East 3 – Hard Substrate and Rocks with Turf Algae and Macroalgae on Sandy Ocean Floor (Depth ~16 m)

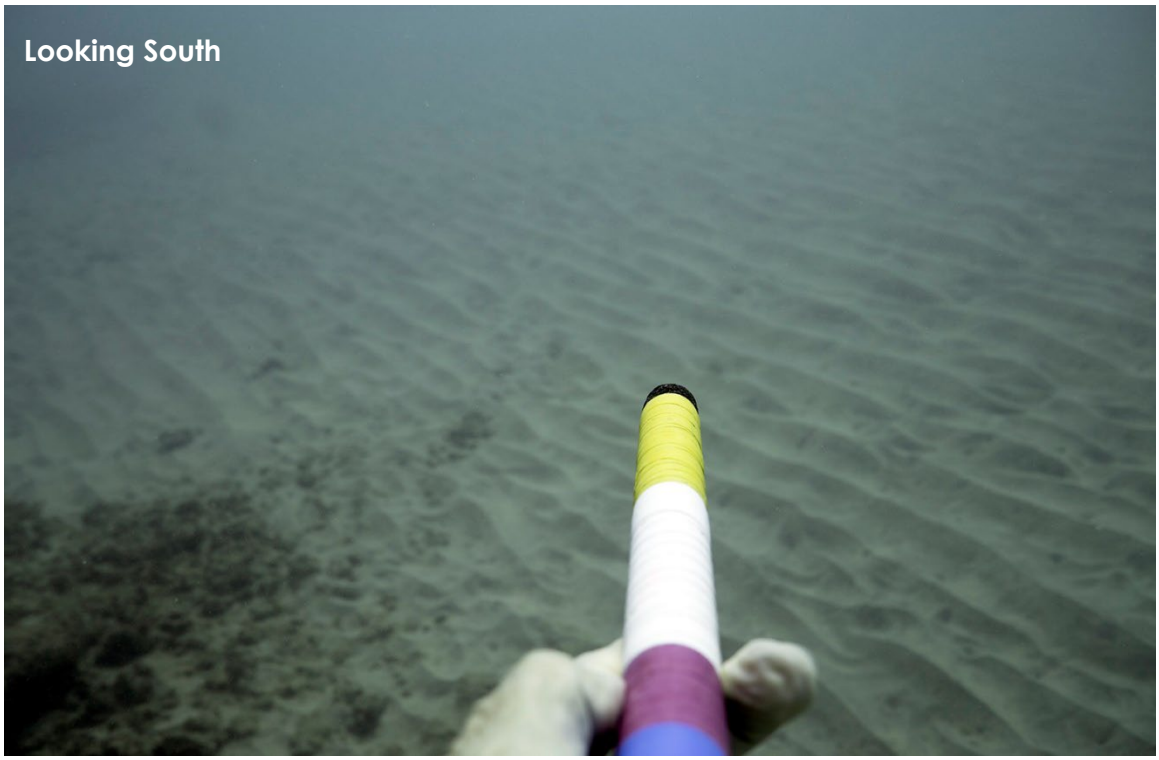


Figure 5 East 3 – Rocks with Turf Algae (lower left corner) and Sandy Ocean Floor at (Depth ~16 m)



Figure 6 East 4 – Patch of Hard Substrate (~ 30 cm in diameter) with Turf Algae on Sandy Ocean Floor (Depth ~19 m)



Figure 7 East 5 – Sandy Ocean Floor at (Depth ~23 m)

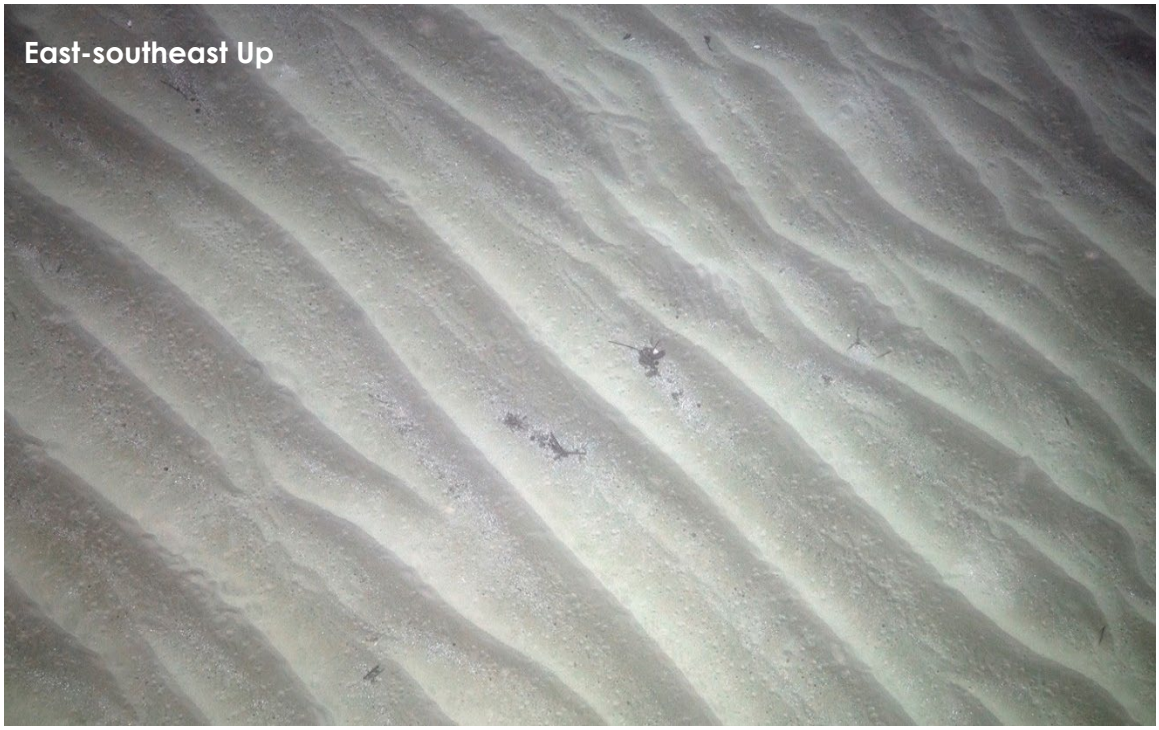


Figure 8 East 6 – Sandy Ocean Floor (depth ~26 m)

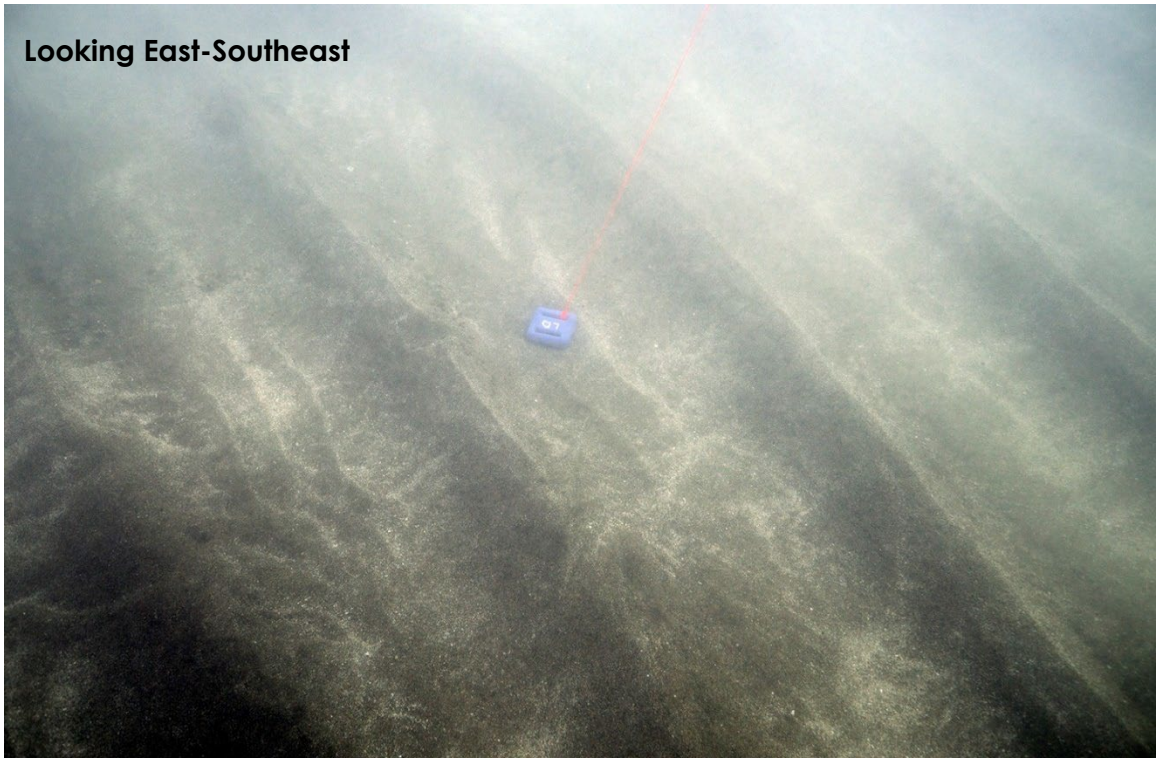


Figure 9 West 1 (Potential Punchout Point) – Sandy Ocean Floor (Depth ~10 m)

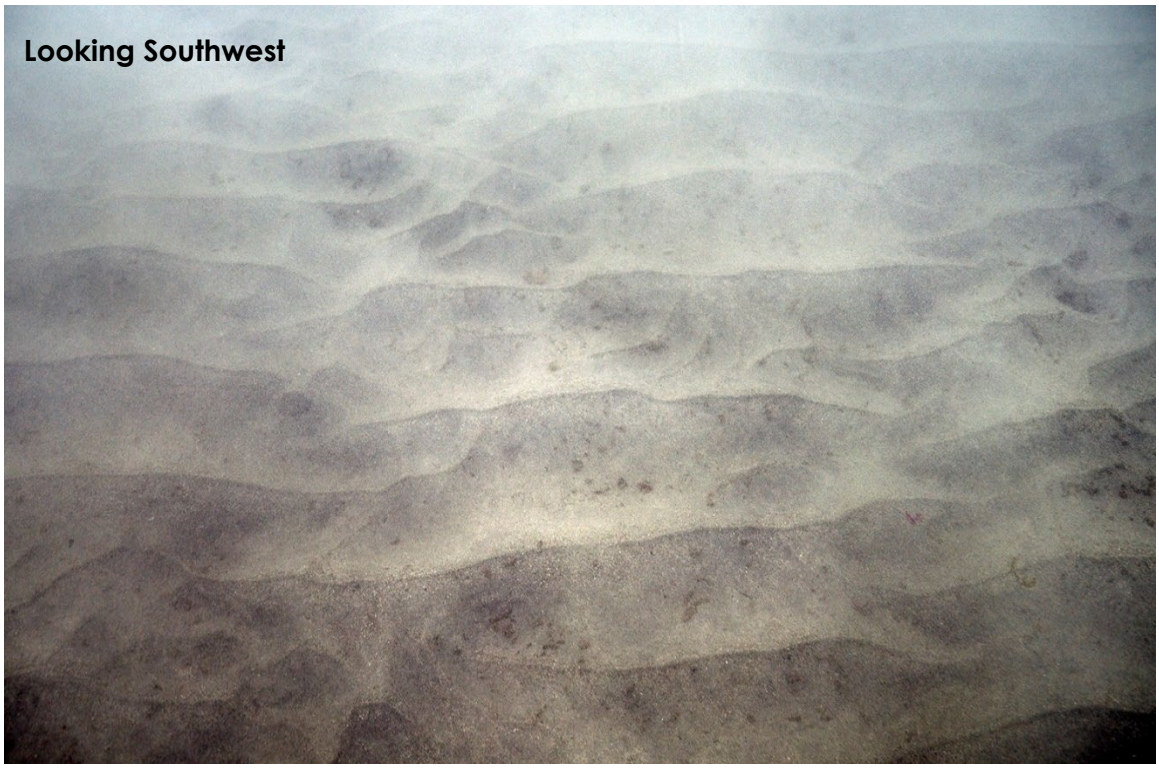


Figure 10 West 2 – Sandy Ocean Floor (Depth ~9 m)



Figure 11 West 3 – Sandy Ocean Floor (Depth ~12 m)



Figure 12 West 3 – School of Juvenile *Caranx melampygus* (Giant trevally) in the Water Column

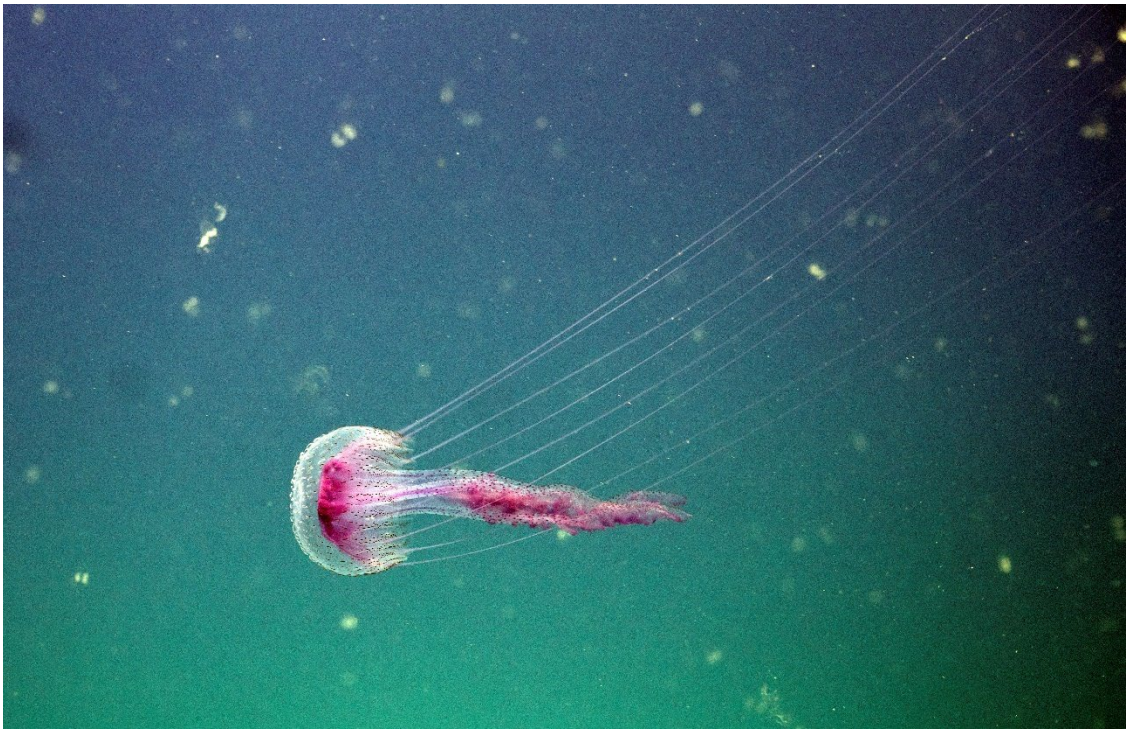


Figure 13 East 5 – *Pelagia noctiluca* (Mauve stinger) in the Water Column

MARINE RESEARCH CONSULTANTS, INC.

Marine Biota Survey – Hawaiian Island Fiber Link Project Kaunakakai, Moloka‘i



SUBMITTED TO:
Ocean Networks, INC (ONI)
And TetraTech

PREPARED BY:
Marine Research Consultants, Inc.
46-312C Haiku Rd
Kaneohe, HI 96744
808-779-4009

DATE: August 27, 2025

TABLE OF CONTENTS

1 INTRODUCTION 1

2 METHODS 1

2.1 HDD Punchout 1

2.2 Surface-Laid Cable Route within the Harbor 2

2.3 Surface-Laid Cable Route Outside of the Harbor 2

3 RESULTS 5

3.1 HDD PUNCHOUT 5

3.2 SURFACE-LAID CABLE ROUTE 6

4 SUMMARY 7

List of Figures

Figure 1 Aerial Photograph of Kaunakakai Harbor Showing the Proposed HDD Punchout Point, Survey Areas, Surface-Laid Cable Route, and NOAA Benthic Habitat Data 4

Figure 2 Mixed Assemblages of Macroalgae in the Vicinity of the Proposed HDD Punchout 10

Figure 3 *Halophila* sp. (seagrass) in the Vicinity of the Proposed HDD Punchout 11

Figure 4 *Leptastrea purpurea* (crust coral) in the Vicinity of the Proposed HDD Punchout. 12

Figure 5 Representative Images of Non-Coral Invertebrates and Fish at the Proposed HDD Punchout 13

Figure 6 Representative Images from Segment 1. 14

Figure 7 Representative Images of Soft Sediment from Segment 2. 15

Figure 8 Representative Images of Corals and Seagrass from Segment 2. 16

Figure 9 Representative Images from Segment 3. 17

Figure 10 Representative Images from Segment 4. 18

Figure 11 Representative Image from P2 19

Figure 12 Representative Image from P3 19

Figure 13 Representative Image from P6 20

Figure 14 Representative Image from P7 20

Figure 15 Representative Images from P7 21

Figure 16 Representative Image from P8 22

Figure 17 Representative Image from P9 22

List of Tables

Table 1 GPS Coordinates for all Survey Locations 3
Table 2 All Species of Coral, Non-Coral Invertebrates, Macroalgae, Seagrass, and Fish Observed During Surveys in Kaunakakai, Moloka'i 9

1 INTRODUCTION

The Hawaiian Islands Fiber Link (HIFL) project is a proposed interisland subsea fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the State of Hawai'i. The Project involves construction, operation, and maintenance of a subsea cable that would interconnect the six main Hawaiian Islands, with cable landing sites located on Kaua'i (Nukoli'i Beach), O'ahu (Barbers Point), Maui (Kahului Harbor), Moloka'i (Moloka'i Yacht Club), Lāna'i (Mānele Harbor), and Hawai'i Island (Pacific Aquaculture & Coastal Resource Center, Hilo). The cable, which would have a maximum diameter of approximately 1.1 inches, would be surface laid on the seabed within state and U.S. federal waters between these sites. At all six of the cable landing sites, horizontal directional drilling (HDD) would be used to allow the cable to traverse underneath the shoreline between the onshore portion of the cable landing site and the respective offshore punchout location in the nearshore waters.

Marine Research Consultants, Inc., (MRCI) was contracted to conduct marine benthic surveys at each of the six cable landing sites. This report presents the results of the in-water survey of the HDD punchout area and surface-laid cable route for the Kaunakakai site, located on the southern side of the island of Moloka'i (Figure 1).

2 METHODS

Marine biota surveys offshore of Kaunakakai on the island of Moloka'i were conducted on June 3, 2024, and January 18, 2025. Data was collected at the proposed HDD punchout location as well as along the surface-laid cable route extending from the inner harbor to outside of the harbor (Figure 1, Table 1). The survey was conducted by three marine biologists (S. Dollar, A. Millan, and C. Stronach) using SCUBA working off a small boat.

During marine biota surveys, positioning data was recorded, and sites were located using a handheld Global Position System (GPS) device (Garmin GPS Map79s). Divers collected representative photographs of all observed corals, non-coral invertebrates, fish, seagrass, and macroalgae as well as topographical and structural features and substrate type. All photographs were acquired using a digital mirrorless camera (Sony A7R5) in an underwater housing (Nauticam). Species lists of all biota were tabulated from in situ observations as well as from review of photographs.

2.1 HDD Punchout

The survey of the HDD punchout point, located in Kaunakakai Harbor, was conducted on June 3, 2024, and was intended to characterize the harbor floor within a radius of 30 meters (m) of the punchout (Figure 1, Table 1). Once the dive team reached the

location, a weighted buoy was deployed to mark the site. Owing to low visibility and shallow depth at this location, orthomosaic image collection was not possible. In lieu of orthomosaic imagery, representative photographs of the harbor floor and resident biota were collected in the vicinity of the HDD punchout point to the extent possible.

2.2 Surface-Laid Cable Route within the Harbor

The first ~800 m of the surface-laid cable route lies within the bounds of Kaunakakai Harbor. The proposed route of the cable through the harbor is along the west side of the channel at the junction of the channel wall and the harbor floor (Figure 1).

Underwater visibility in this region at the time of the survey was approximately 30 cm (1 ft). Such limited visibility is likely typical for bottom water in Kaunakakai Harbor and the associated channel. Surveys were conducted on four segments along this route that extended from the HDD punchout point for ~700 m along the base of the channel wall (Segment [S] 1-4). Strong winds did not allow for safe boating conditions near the edge of the dredge cut channel where the top of the ledge is at a water depth of ~1 m (3 ft). Therefore, divers entered the water upwind (east) of the ledge then swam to the ledge before dropping down to the channel floor. Divers aimed for a length of roughly 75 m for each segment (Table 1). Divers collected representative photographs of the harbor floor and resident biota along S1-S4. Owing to the limited dive time along each segment as well as extremely limited visibility, quantitative data of corals and other biota were not collected. In lieu of this quantitative data, species lists and estimates of percent cover for sensitive biota were made based on observations made at each dive point.

2.3 Surface-Laid Cable Route Outside of the Harbor

Divers conducted bounce dive photo surveys at 9 points (P1-P9) between the outer edge of the harbor and ~800 m offshore of the harbor (Figure 1, Table 1). Once the team reached the photo survey point, a weighted buoy was deployed to mark the site and to provide a descent and ascent line for the divers. Owing to diver depth limitations (nitrogen loading), it was not possible to conduct long swim surveys at each of the 9 deeper offshore sites. Therefore, divers entered the water at the given point and conducted a survey that did not exceed 5 minutes at each site. One diver collected representative photographs of the seafloor and resident biota while the other diver recorded in situ notes on all observed biota at points P1-P9. Estimates of percent cover for sensitive biota were made based on observations made at each dive point.

Table 1 GPS Coordinates for all Survey Locations

SITE NAME	DATE of SURVEY	LAT	LONG	DEPTH (m)	Segment Length (m)
HDD Punchout	06/03/24	21.08614	-157.02653	1	NA
S1	06/03/24	21.08583	-157.02698	1	55
S2	06/03/24	21.08482	-157.02820	2	92
S3	06/03/24	21.08397	-157.02923	3	68
S4	06/03/24	21.08269	-157.03014	6	49
P1	01/18/25	21.08035	-157.03156	8	NA
P2	01/18/25	21.07911	-157.03193	9	NA
P3	01/18/25	21.07844	-157.03194	12	NA
P4	01/18/25	21.07783	-157.03207	18	NA
P5	01/18/25	21.07724	-157.03246	15	NA
P6	01/18/25	21.07614	-157.03309	15	NA
P7	01/18/25	21.07490	-157.03298	20	NA
P8	01/18/25	21.07441	-157.03315	24	NA
P9	01/18/25	21.07378	-157.03340	20	NA

Note: S = Survey Segment, P = Photo Survey, m = meters

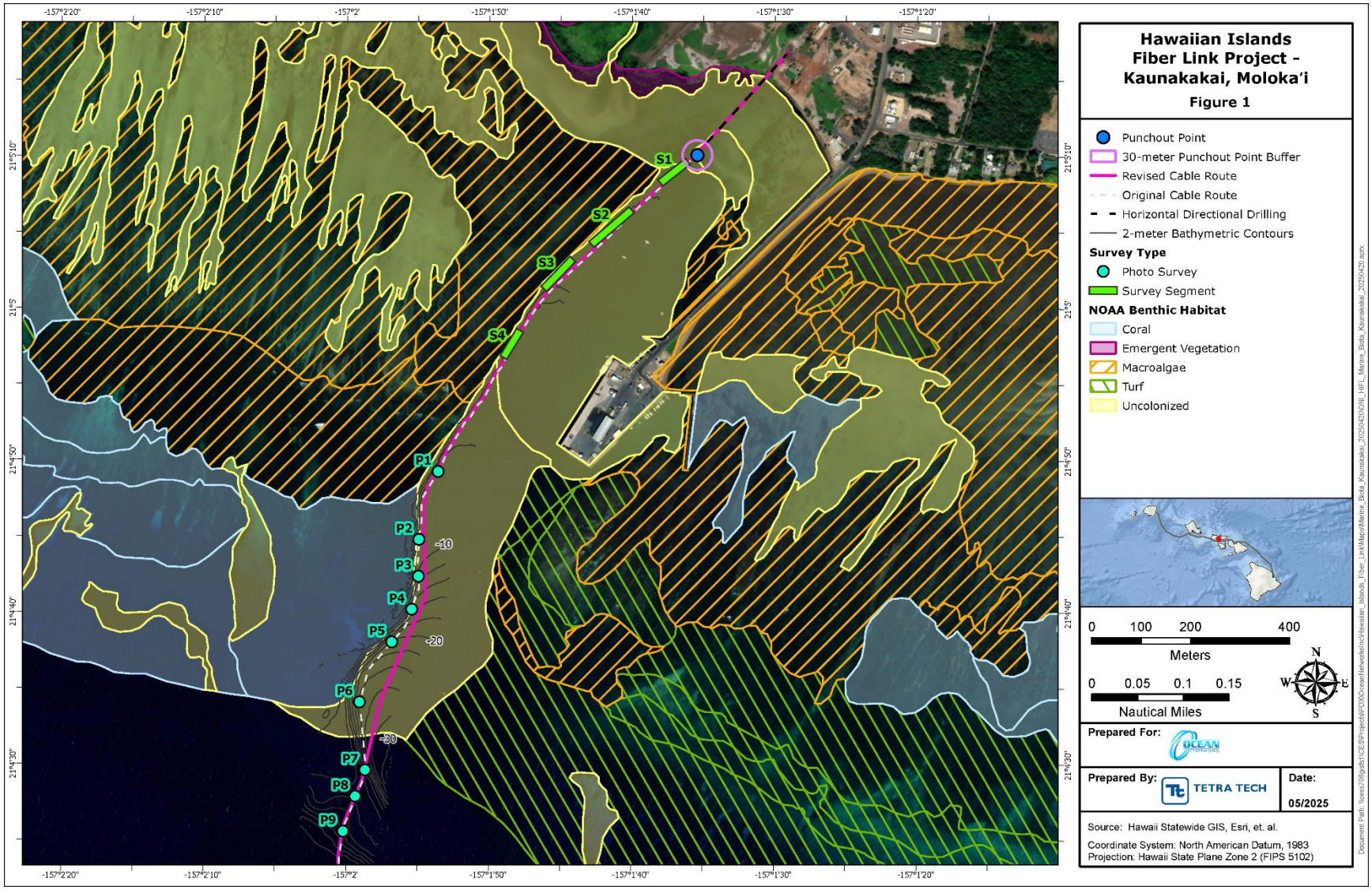


Figure 1 **Aerial Photograph of Kaunakakai Harbor Showing the Proposed HDD Punchout Point, Survey Areas, Surface-Laid Cable Route, and NOAA Benthic Habitat Data**

3 RESULTS

3.1 HDD PUNCHOUT

The proposed HDD punchout (punchout) is located in the inner region of the harbor approximately 200 meters (m) from the shoreline (Figure 1). Water depth varies between approximately 1 to 2 m depending on the stage of the tide. In this area the harbor floor consists of sand and fine-grained sediment with minimal patches of hard substrate. The water column is generally extremely turbid owing to a combination of resuspension of fine-grained sediment and restricted circulation. Such high turbidity is likely the normal condition for this site. Underwater visibility during the survey was approximately 5 ft.

The primary biotic component in the vicinity of the punchout was macroalgae (Figure 2). In total, 8 species of macroalgae were identified within a radius of ~30 m of the punchout (Table 2). The brown algae *Dictyota acutiloba* (twisted dictyota) and *D. ceylanica* (miniature dictyota) and the red alga *Spyridia filamentosa* (no common name) comprised the dominant identifiable species. *Gracilaria salicornia* (gorilla ogo) and *Acanthophora spicifera* (prickly seaweed) were common in the vicinity of the punchout. Both of these species are classified as invasive in the State of Hawaii.

Patches of seagrass (*Halophila* spp.) were present on the harbor floor within a 30 m radius of the punchout (Figure 3). Owing to extremely limited visibility, it was not possible to accurately quantify the overall percentage of the bottom covered with seagrass. However, divers estimate patches of seagrass covered 20-40% of the harbor floor in the vicinity of the punchout. As the survey of the punchout was conducted in June 2024, the observed seagrass was likely at or near its seasonal peak extent. Thus, it is probable that the seagrass beds would not be more extensive in the winter months.

Small encrusting colonies of *Leptastrea purpurea* (crust coral) were sparsely distributed on hard substrate in the vicinity of the punchout (Figure 4). Each of these colonies was less than 10 centimeters (cm) in longest dimension. No other species of coral were observed with a 30 m radius of the punchout.

Five species of non-stony coral invertebrates were observed during the survey of the punchout in Kaunakakai Harbor (Table 2). Urchins were represented by *Tripneustes gratilla* (collector urchin, Figure 5 A) and *Diadema savignyi* (blue-lined long-spined urchin, Figure 5 B). Anemones were represented by *Aiptasia pulchella* (glass anemone, Figure 5 C) and *Gyractis sesere* (Sesere's anemone). A variety of sponges were also present in the vicinity of the punchout. The only fish observed during the survey of the punchout was a *Canthigaster jactator* (Hawaiian whitespotted puffer) (Figure 5 D).

3.2 SURFACE-LAID CABLE ROUTE

The benthos along the surface-laid cable route was photodocumented along four segments within the inner harbor and 9 points within the outer harbor (Figure 1, Figure 6-Figure 10). Along the four segments within the inner harbor, the cable route is located on primarily soft sediment at the junction of the harbor floor and the nearly vertical channel wall. The harbor floor consists of a bed of fine-grained sediment pocked with numerous holes from burrowing infauna, most likely crustaceans and worms (Figure 7). Corals were primarily limited to the hard substrate of the channel wall. However, occasional sections of reef and reef rubble extended off the channel wall and onto the harbor floor. Therefore, small sections of the cable route may need to traverse short segments of hard bottom habitat.

The channel wall is heavily colonized by a variety of Hawaiian reef corals (Table 2). The most common corals were encrusting and branching growth forms of *Montipora capitata* (rice coral) and branching colonies of *Porites compressa* (finger coral). The presence of corals at such high densities was somewhat unexpected owing to the extremely high content of suspended sediment in the water column. Such high sediment loads typically preclude abundant coral communities owing to smothering by sedimentation and limited light availability.

Two patches of seagrass were observed at the edge of the harbor floor along Segment 2 (Figure 8). The blades of the seagrass within these patches were sparsely distributed. Seagrass was not observed along the other three segments.

Outside of the harbor, dive survey points P1-9 showed a transition in the benthic community structure of the harbor. Dive survey points P1-5 were similar in composition to S2-4 in terms of the junction of the vertical channel wall terminating in a bed of soft sediment on the channel floor (Figure 11, Figure 12). These sites were also characterized by highly turbid water, which limited the range of in situ observations to a small area and restricted the ability to collect photographs. Site P6 was located between a sloping ledge and the deeper channel floor. The primary biotic component at P6 was macroalgae, dominated by *Halimeda kanaloana* (Kanaloa's halimeda, Figure 13).

Sites P7-9 were located beyond the outer boundary of the channel entrance resulting in substantially lower turbidity in the water column. The bottom composition at P7-9 consisted of hard substrate with a veneer of sand and cobbles (Figure 14-Figure 17). The hard substrate and larger cobbles were colonized by macroalgae and turf algae. Small colonies of coral, primarily less than 40 cm in diameter, were sporadically present on the emergent hard substrate and larger cobbles. *Montipora capitata* (rice coral) and *Porites lobata* (lobe coral) comprised the dominant species. Coral cover at P7-9 ranged from an estimated 1-3% of bottom cover and appeared to decrease moving seaward. Seagrass was not observed at any of the photodocumentation points (P1-9).

Eleven (11) species of non-coral invertebrates were detected during surveys conducted along the surface-laid cable route (Table 2). With four distinct species, the urchins were

the most represented group of non-coral invertebrates. *Tripneustes gratilla* (collector urchins), primarily covered in mixed macroalgae, were most commonly observed on soft substrate at the inner harbor sites. The other three species of urchins were most common on the hard substrate at S2, corals along the channel wall, and on the hard substrate at the offshore end of the survey area. Two species of sea stars, *Leiaster leachi* (purple velvet star) and *Pentaceraster cumingi* (knobby star, Figure 17) were observed between P7 and P9.

Owing to extremely limited visibility, fish detectability was low during surveys conducted in Kaunakakai in both June 2024 and January 2025. In total, 6 species of fish were observed during photodocumentation surveys conducted along the surface-laid cable route (Table 2).

4 SUMMARY

Surveys of the proposed HDD punchout and surface-laid cable were conducted in June 2024 and January 2025. The HDD punchout is located in the inner region of the harbor where water conditions include extremely high turbidity. The harbor floor consists of sand and fine-grained sediment with minimal patches of hard substrate. Small (primarily <10 cm in diameter) encrusting colonies of *Leptastrea purpurea* (crust coral) were sparsely distributed on hard substrate in the vicinity of the punchout.

The primary biotic component in the vicinity of the punchout was macroalgae. Thin patches of seagrass (*Halophila* spp.) covered ~20-40% of the harbor floor within a 30 m radius of the punchout. Although patches of seagrass were present in the vicinity of the proposed HDD punchout, impacts to this resource can be reduced by having divers place the cable by hand. If the cable must traverse patches of seagrass, it is expected that impacts to the seagrass would be minimal and temporary as the cable is of a small diameter and is anticipated to self-bury after installation.

From the HDD punchout the proposed cable route traverses the soft substrate of the channel floor at the base of the vertical channel wall. The harbor floor along the cable route in the inner harbor consists of a bed of fine-grained sediment pocked with numerous holes from burrowing infauna, most likely crustaceans and worms. The channel wall is heavily colonized by a variety of Hawaiian reef corals, primarily encrusting and branching growth forms of *Montipora capitata* (rice coral) and branching colonies of *Porites compressa* (finger coral). However, the proposed cable route has been sited to avoid the near vertical wall. In addition, the cable route was further refined to avoid and minimize impacts to hard bottom habitat at the base of the channel wall as identified during the marine resource survey (Figure 1). As occasional areas of hard substrate extend into the channel, sections of the cable route are likely to traverse small areas of hard substrate and may result in minimal impacts to corals.

The benthos outside of the harbor and extending to the outer edge of the survey area consist of hard substrate with a veneer of sand and cobbles. Corals < 40 cm in diameter covered an estimated 1-3% of the bottom. Based on survey results, the cable route through this area was refined to avoid steep bathymetric changes and minimize impacts to hard bottom, particularly in the vicinity of dive survey points P4-P6 (Figure 1). Diver-directed laying of the cable will be done in such a manner as to minimize contact of the cable with corals and other hard bottom features to the extent feasible. Seagrass was not observed at any of the survey points beyond 500 m of the shoreline (S2, Figure 1).

Table 2 All Species of Coral, Non-Coral Invertebrates, Macroalgae, Seagrass, and Fish Observed During Surveys in Kaunakakai, Moloka'i

CATEGORY	SPECIES	COMMON NAME	HDD PUNCHOUT	CABLE ROUTE
CORAL	*Leptastrea purpurea*	Crust coral	X	X
	Montipora capitata	Rice coral		X
	Montipora patula	Ringed rice coral		X
	Pocillopora damicornis	Lace coral		X
	Porites compressa	Finger coral		X
	Porites lobata	Lobe coral		X
NON-CORAL INVERTEBRATES	*Aiptasia pulchella*	Glass anemone	X	
	Diadema paucispinum	Long-spined urchin		X
	Diadema savignyi	Blue-lined long-spined urchin	X	X
	Echinothrix calamaris	Banded urchin		X
	Gyractis sesere	Sesere's anemone	X	
	Holothuria edulis	Burnt hot dog sea cucumber		X
	Leiaster leachi	Purple velvet star		X
	Loimia medusa	Spaghetti worm		X
	Mycale grandis	Keyhole sponge		X
	Pentaceraster cumingi	Knobby star		X
	Porifera	Sponge	X	X
	Tripneustes gratilla	Collector urchin	X	X
	Spheciospongia vagabunda	Vagabond boring sponge	X	
	Stylinos sp.	Pitted orange sponge		X
MACROALGAE	*Acanthophora spicifera*	Prickly seaweed	X	
	Crustose Coralline Algae	Crustose coralline algae		X
	Dictyota acutiloba	Twisted dictyota	X	
	Dictyota ceylanica	Miniature dictyota	X	X
	Gracilaria salicornia	Gorilla seaweed	X	X
	Halimeda kanaloana	Kanaloana's seaweed	X	X
	Halimeda opuntia	Prickly pear seaweed		X
	Hypnea cervicornis	Antler seaweed	X	
	Neomeris sp.	Finger seaweed	X	X
	Padina sp.	Padina seaweed		X
	Spyridia filamentosa	NA	X	X
SEAGRASS	*Halophila* spp.	Seagrass	X	X
FISH	*Canthigaster jactator*	Hawaiian whitespotted puffer	X	X
	Chaetodon lunulatus	Oval butterflyfish		X
	Dascyllus albisella	Hawaiian dascyllus		X
	Lutjanus kasmira	Bluestripe snapper		X
	Oxycheilinus bimaculatus	Twospot wrasse		X
	Thalassoma duperrey	Saddle wrasse		X

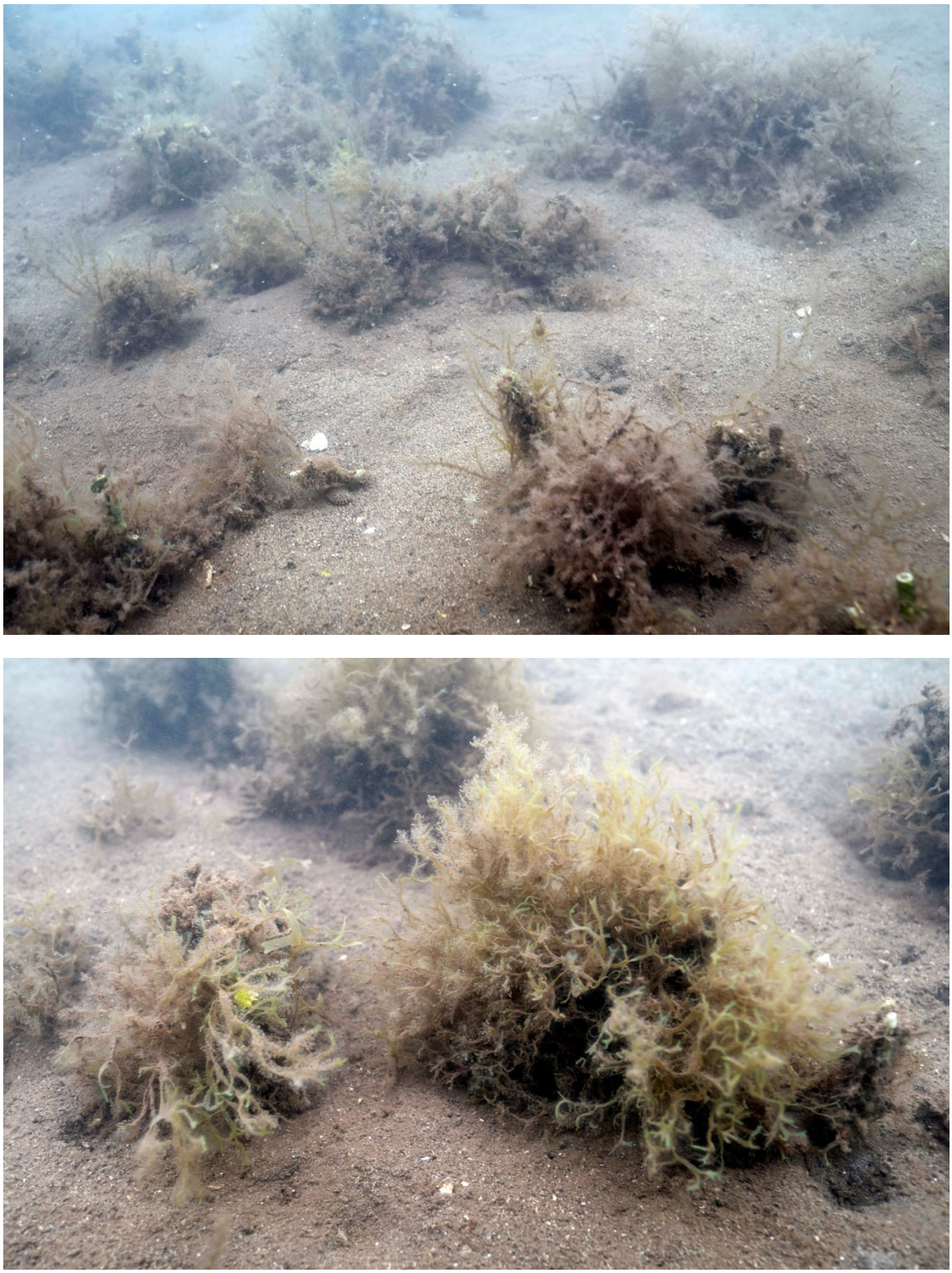


Figure 2 **Mixed Assemblages of Macroalgae in the Vicinity of the Proposed HDD Punchout**



Figure 3 ***Halophila*** **sp. (seagrass) in the Vicinity of the Proposed HDD Punchout**



Figure 4 ***Leptastrea purpurea*** **(crust coral) in the Vicinity of the Proposed HDD Punchout.**



Figure 5 Representative Images of Non-Coral Invertebrates and Fish at the Proposed HDD Punchout

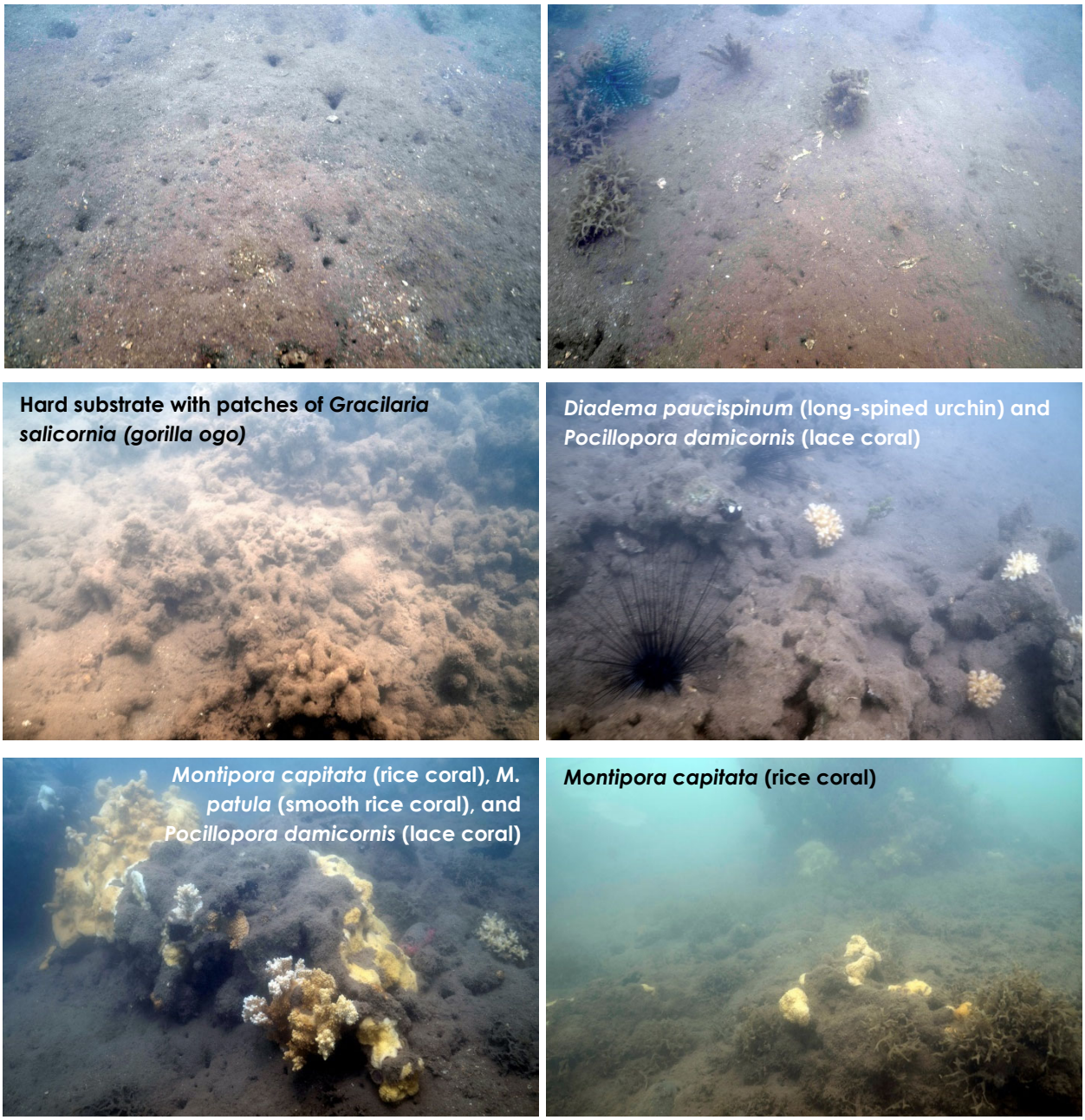


Figure 6 Representative Images from Segment 1.

Note, the diver-laid cable will be placed on soft sediment and will avoid corals to the extent feasible.

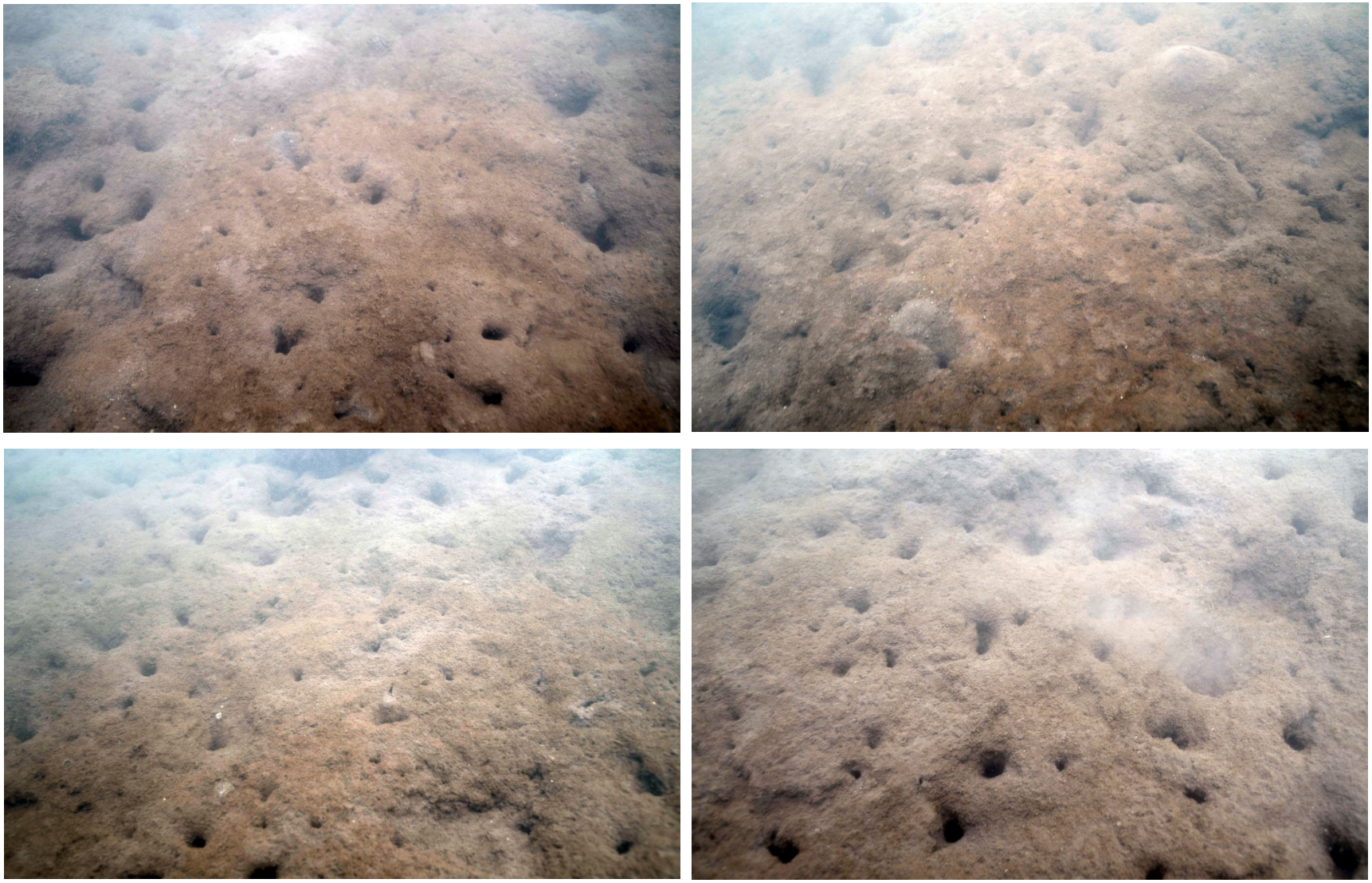
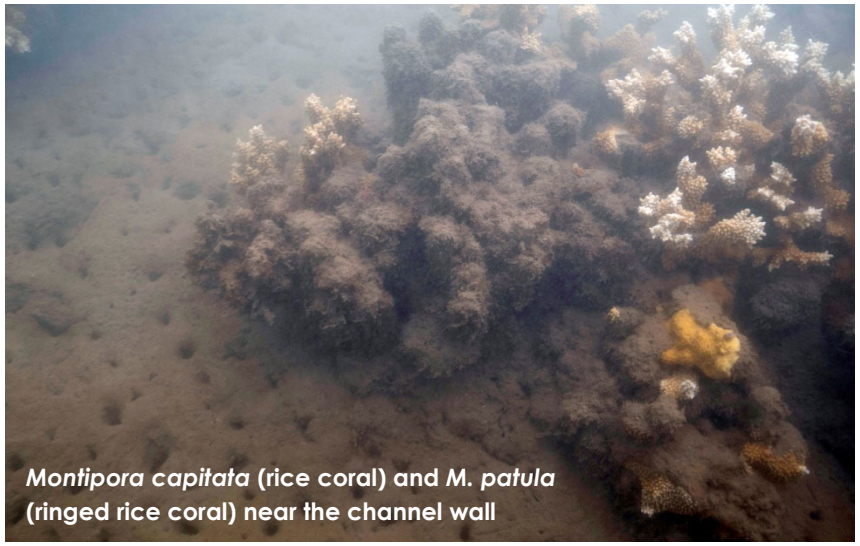
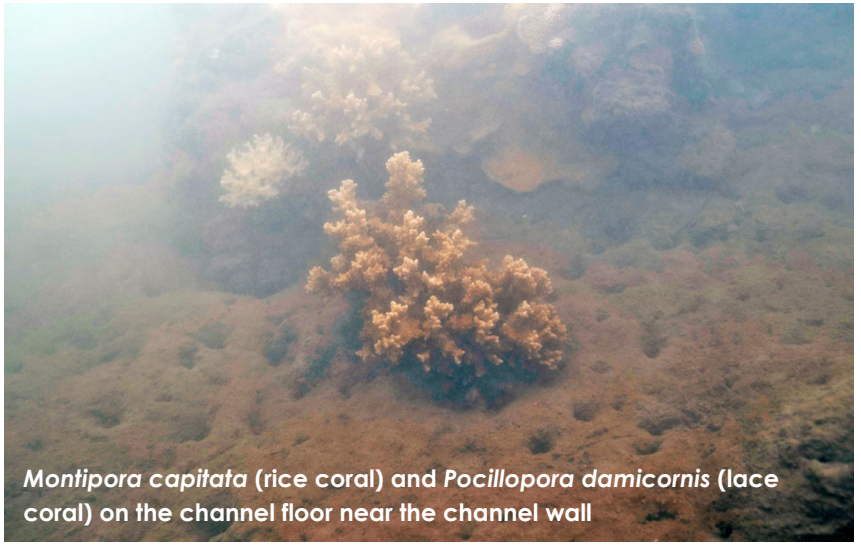


Figure 7 Representative Images of Soft Sediment from Segment 2.

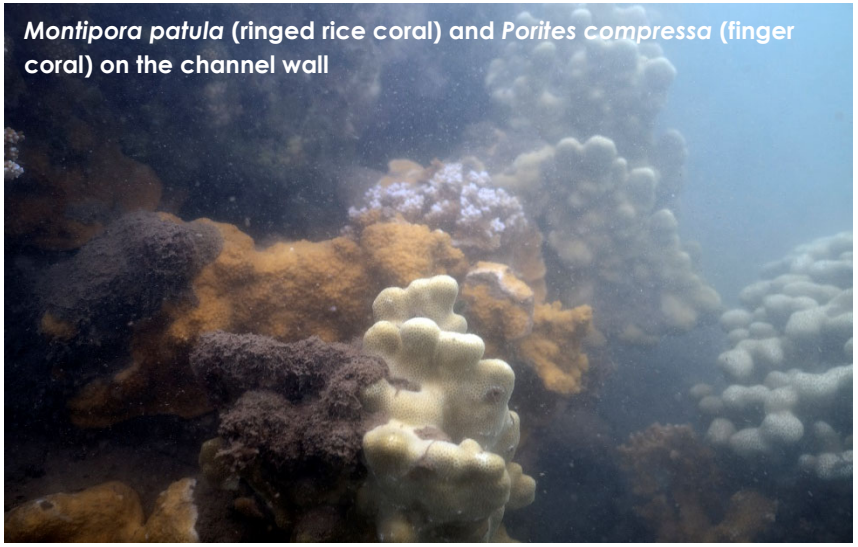
Note, the diver-laid cable will be placed on soft sediment and will avoid corals to the extent feasible.



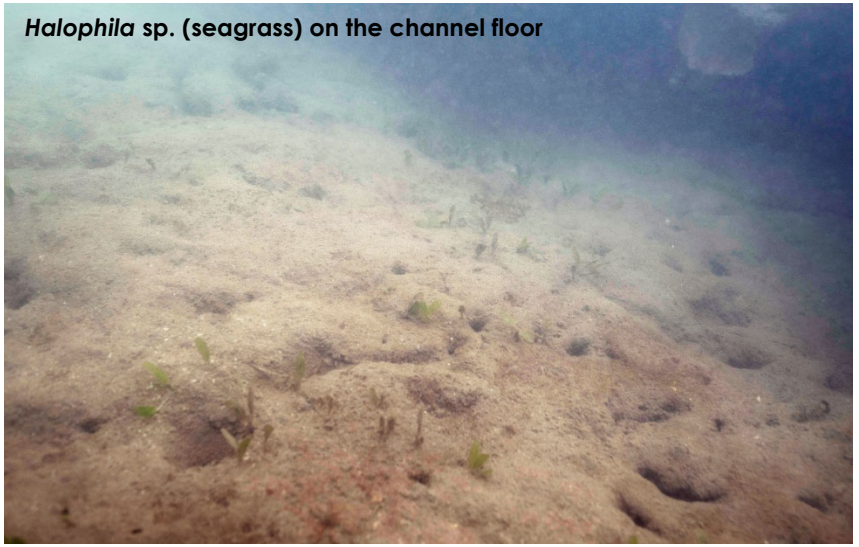
Montipora capitata (rice coral) and *M. patula* (ringed rice coral) near the channel wall



Montipora capitata (rice coral) and *Pocillopora damicornis* (lace coral) on the channel floor near the channel wall



Montipora patula (ringed rice coral) and *Porites compressa* (finger coral) on the channel wall



Halophila sp. (seagrass) on the channel floor

Figure 8 Representative Images of Corals and Seagrass from Segment 2.



Figure 9 Representative Images from Segment 3.

Note, the diver-laid cable will be placed on soft sediment and will avoid corals to the extent feasible. Owing to highly turbid water, acquiring photographs of the soft sediment, which comprised the majority of the channel floor, was difficult.

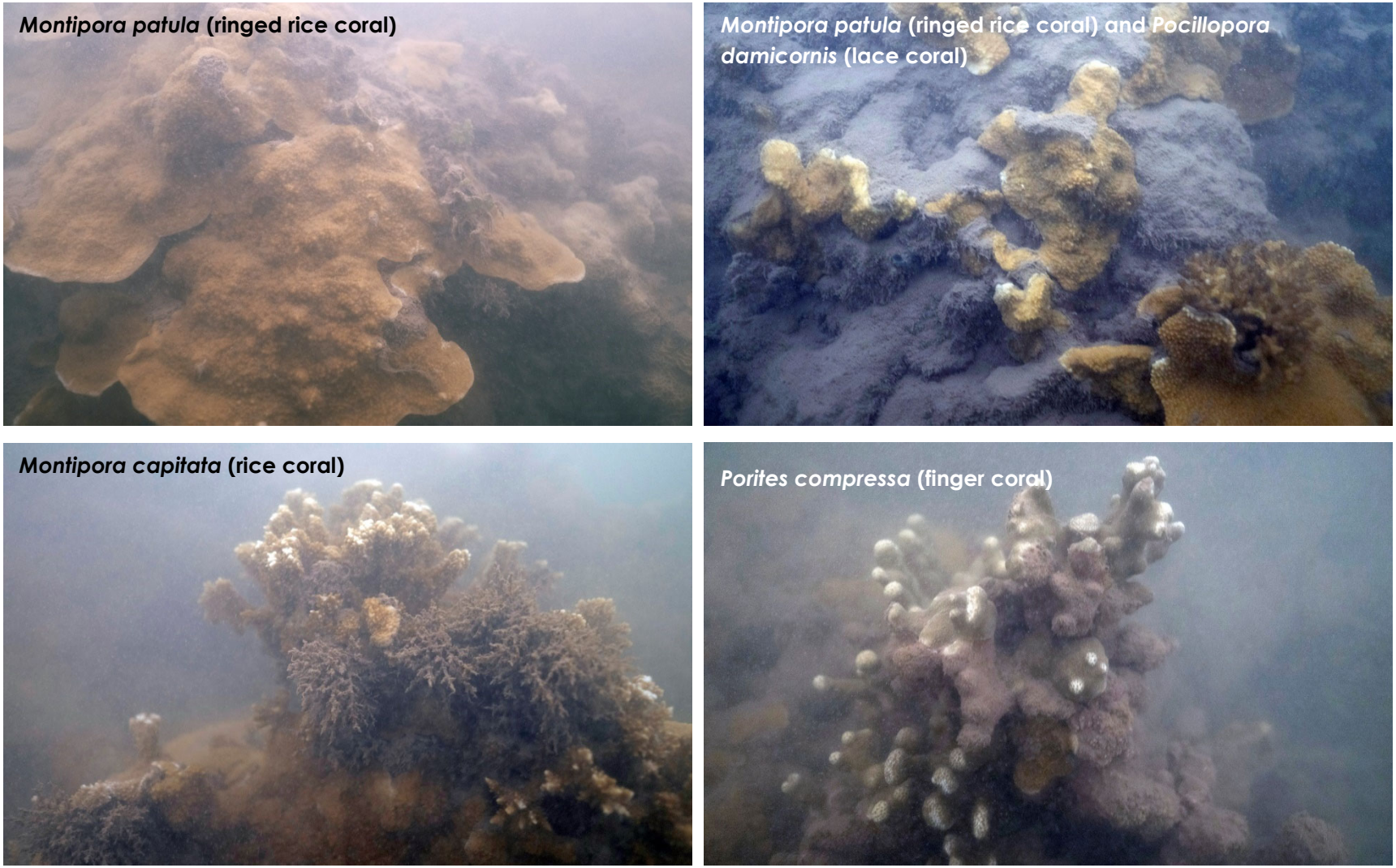


Figure 10 Representative Images from Segment 4.

Note, the diver-laid cable will be placed on soft sediment and will avoid corals to the extent feasible. Owing to highly turbid water, acquiring photographs of the soft sediment, which comprised the majority of the channel floor, was not possible.

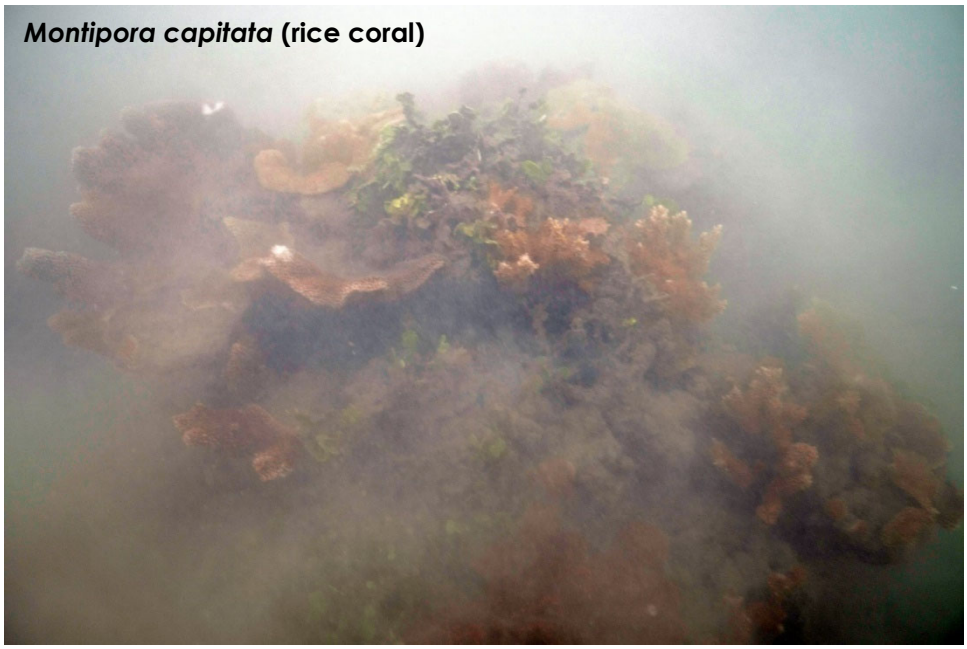


Figure 11 Representative Image from P2

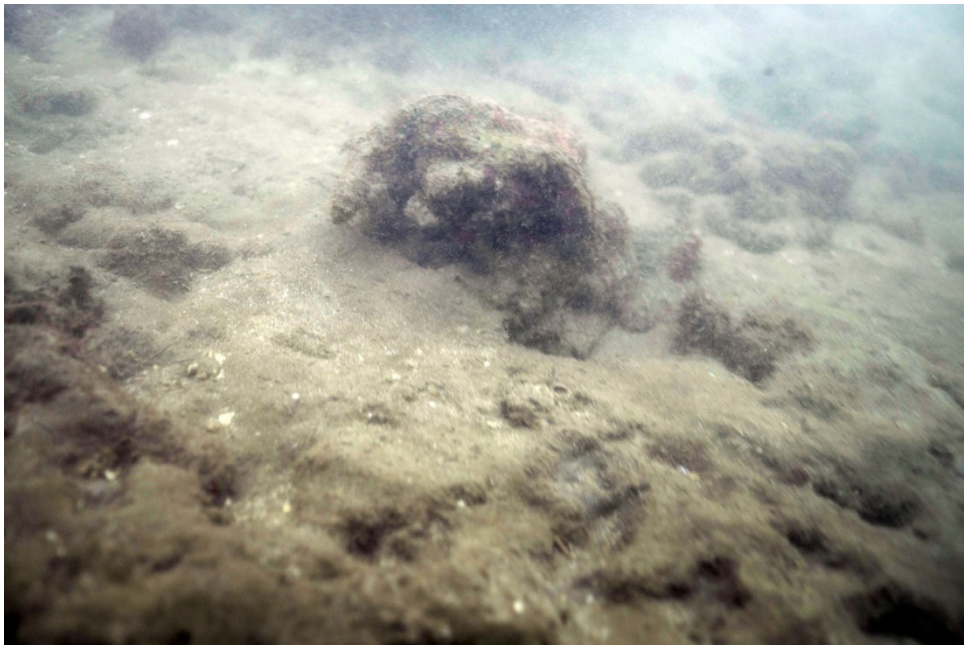


Figure 12 Representative Image from P3

Note, the diver-laid cable in the vicinity of P2 and P3 will be placed on soft sediment and will avoid corals to the extent feasible. Owing to highly turbid water, acquiring photographs of the soft sediment, which comprised the majority of the channel floor, was difficult. The habitat present at P4 and P5 was similar to the habitat at P2 and P3.

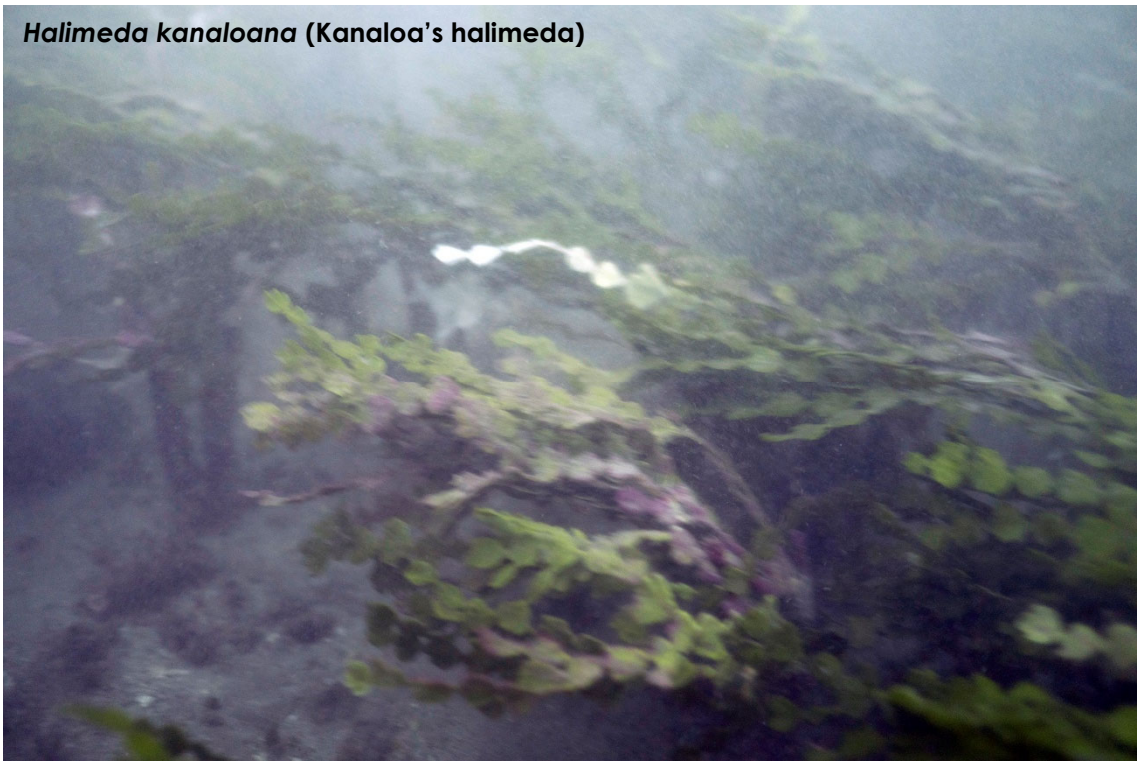


Figure 13 Representative Image from P6

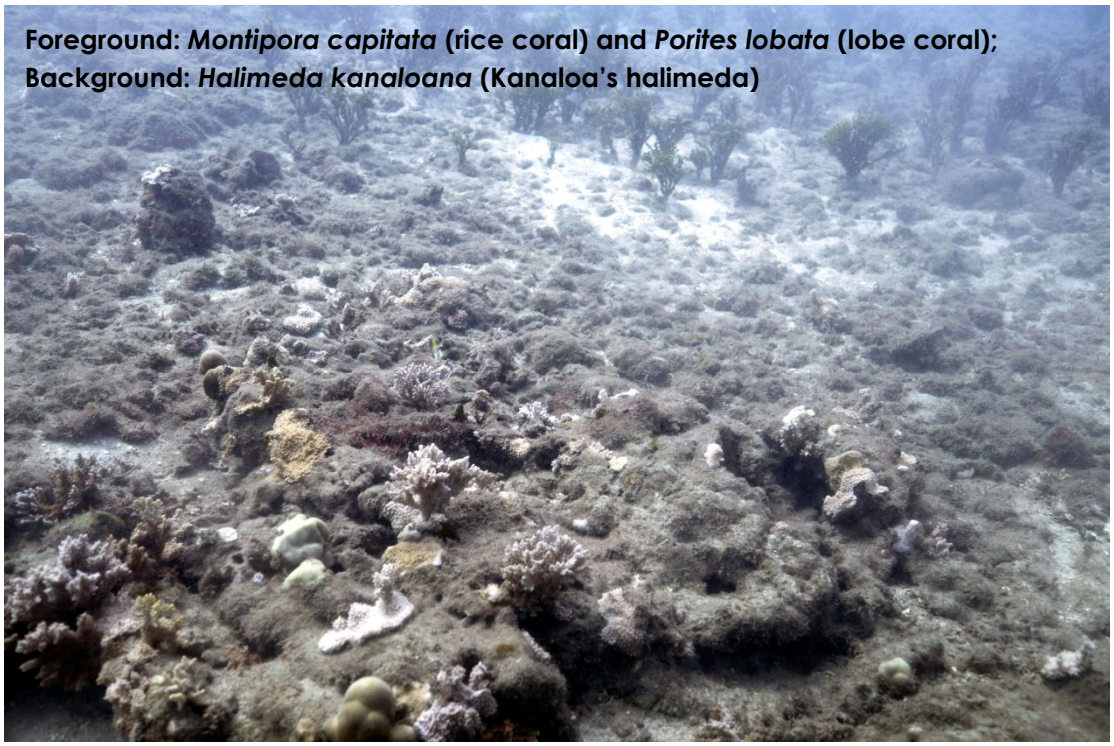


Figure 14 Representative Image from P7

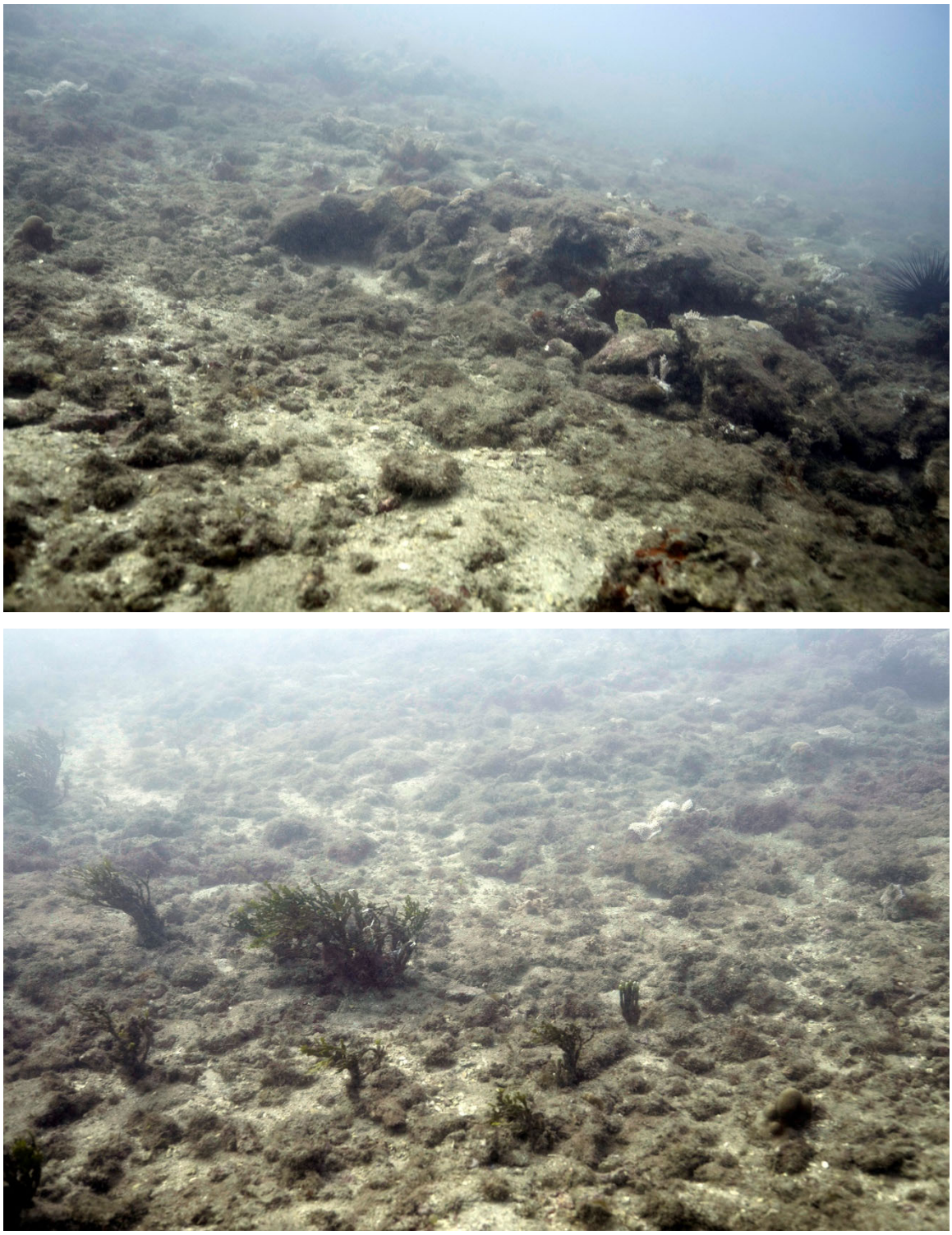


Figure 15 Representative Images from P7

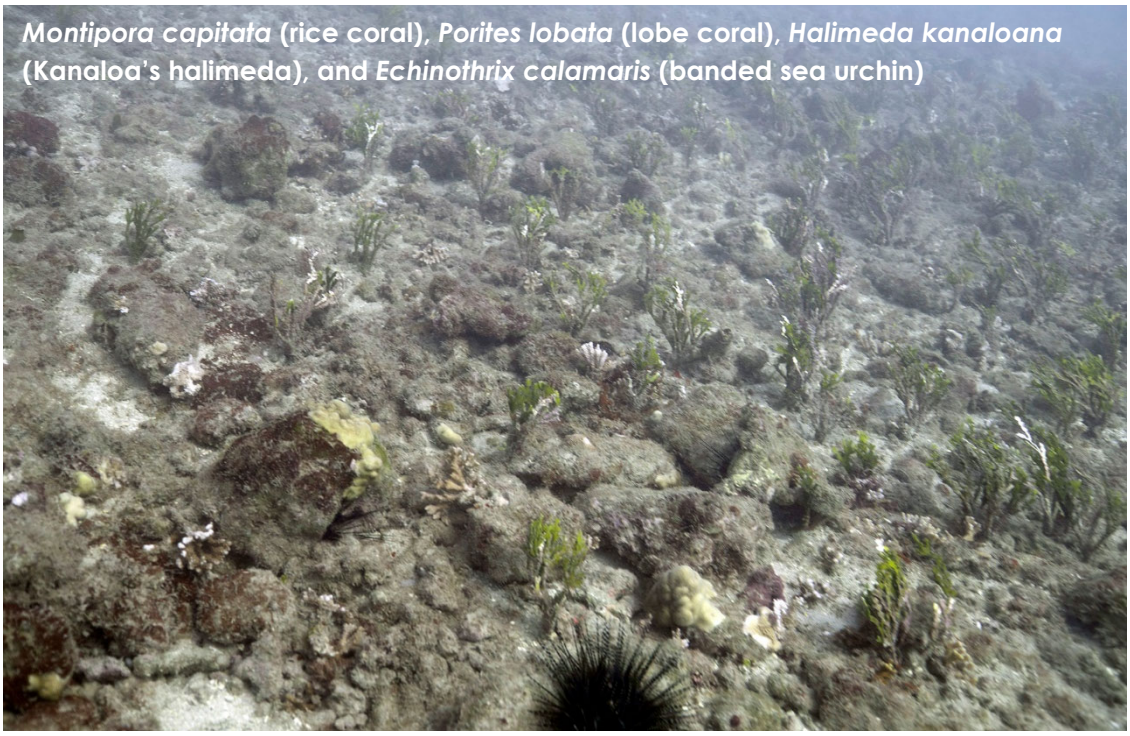


Figure 16 Representative Image from P8

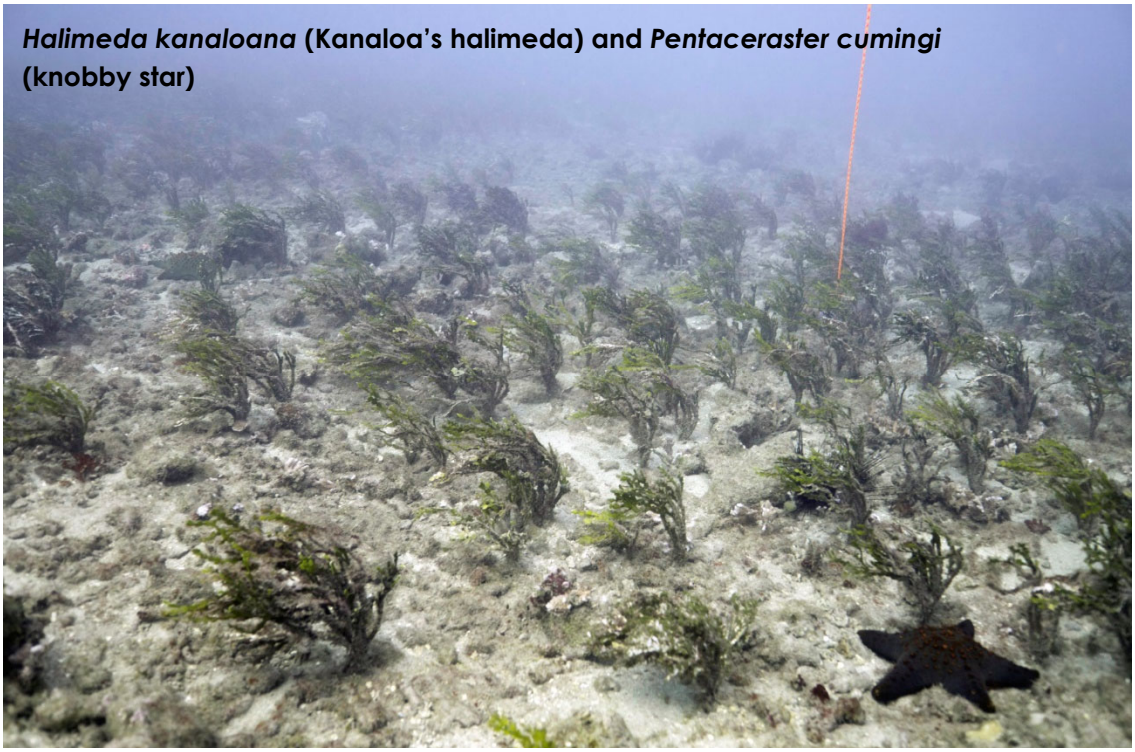


Figure 17 Representative Image from P9

MARINE RESEARCH CONSULTANTS, INC.

Marine Biota Survey – Hawaiian Island Fiber Link Project
Mānele Harbor, Lāna‘i, Hawai‘i



SUBMITTED TO:
Ocean Networks, INC (ONI)
And Tetra Tech, Inc.

PREPARED BY:
Marine Research Consultants, Inc.
46-312C Haiku Rd
Kaneohe, HI 96744
808-779-4009

DATE: July 30, 2025

TABLE OF CONTENTS

1 INTRODUCTION 1

2 METHODS 1

3 RESULTS 5

3.1 PUNCHOUT POINT 5

3.2 CABLE ROUTE 5

3.3 ADJACENT to CABLE ROUTE 5

4 SUMMARY 6

List of Figures

Figure 1 Aerial Photograph of Mānele Harbor and Adjacent Marine Area Showing the Punchout Point and Proposed Cable Route 3

Figure 2 Map Showing Punchout Point, Cable Route, Tow Route with Buffer, and Locations of Significant Biota and Photograph Figures 4

Figure 3 Punchout Point, Water Depth of 22 ft 8

Figure 4 Punchout, Water Depth of 22 ft 9

Figure 5 Cable Route, Water Depth of 40 ft 10

Figure 6 Cable Route, Water Depth of 38 ft, First Observation of *H. kanaloana* 10

Figure 7 Cable Route, Water Depth of 44 ft 11

Figure 8 Cable Route, Water Depth of 54 ft 11

Figure 9 Cable Route, Water Depth of 56 ft 12

Figure 10 Cable Route, Water Depth of 61 ft 12

Figure 11 Cable Route, Water Depth of 64 ft 13

Figure 12 Cable Route, Water Depth of 67 ft 13

Figure 13 Kanaloana's halimeda (*H. kanaloana*), cauliflower coral (*Pocillopora meandrina*), cigar wrasse (*Cheilio inermis*), and two spot wrasse (*Oxycheilinus bimaculatus*) Approximately 200 ft North of the Cable Route, Water Depth of 51 ft 14

Figure 14 Patch of Seagrass (*Halophila* sp.) and Kanaloana's halimeda (*H. kanaloana*) Approximately 200 ft North of the Cable Route, Water Depth of 40 ft 14

List of Tables

Table 1 All Species Observed During Marine Biota Surveys at the Punchout and along the Cable Route and Adjacent to the Punchout Location and Cable Route 7

1 INTRODUCTION

The State of Hawai'i, represented by the University of Hawai'i (UH) Vice President for Information Technology and Chief Information Officer, is proposing the Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the state. To assist with obtaining the necessary permits for the project, UH has engaged Ocean Networks Inc. (ONI), a private company specializing in the development, operation, and maintenance of submarine fiber optic cables.

The proposed project involves construction, operation, and maintenance of an interisland subsea fiber optic cable system with cable landing sites strategically located on Kaua'i (Nukoli'i Beach), O'ahu (Barbers Point), Maui (Kahului Harbor), Moloka'i (Moloka'i Yacht Club), Lāna'i (Mānele Harbor), and Hawai'i Island (Pacific Aquaculture & Coastal Resource Center, Hilo). The cable, which would have a maximum diameter of approximately 1.5 inches, would be surface-laid on the seabed within state and U.S. federal waters to interconnect these sites. At all six of the cable landing sites, horizontal directional drilling (HDD) would be used to traverse underneath the shoreline to a respective offshore punchout location in the nearshore waters; at the remaining location on Hawai'i Island, the cable would be surface-laid across the shoreline.

Marine Research Consultants, Inc., (MRC) was contracted by ONI to conduct marine benthic surveys at each of the six cable landing sites. This report presents the results of the in-water survey of the HDD punchout area and cable route for the Mānele cable landing site, located on the south shore of Lāna'i.

2 METHODS

Surveys of the HIFL punchout point and cable route in Mānele Harbor on the island of Lāna'i were conducted on August 7 and 20, 2024 (Figure 1). The second survey was conducted after post-processing of location data revealed that the initial survey track was displaced by approximately 200 ft. Data collected from August 7 is included to describe adjacent marine biotic community structure but is not directly relevant to the currently proposed cable route.

The marine biota assessment survey was conducted by three marine biologists (S. Dollar, A. Millan, and C. Stronach) using SCUBA working off a small boat. One diver towed a buoy with two redundant handheld Global Position System (GPS) devices that recorded the diver track line (Figure 2). A second diver swam within approximately 3 meters (m) of the swim track and carried an underwater slate and a digital mirrorless camera in an underwater housing. During the survey divers documented all observed coral, non-coral invertebrates, and fish species and collected representative

photographs and video of topographical and structural features, substrate type, and biota. Species lists were tabulated for all fish, coral, and non-coral invertebrates observed during in-water surveys as well as from review of photographs and video.

The punchout point was located using a handheld GPS, at which point a weighted surface float was dropped from the boat. Divers placed four colored scale bars 30 meters away from the punchout point in each cardinal direction. Each scale bar is 30 centimeters (cm) in length and is marked with 10-cm-colored bands. Using the scale bars as a guide, investigators swam a radius of 30 m around the punchout point and recorded video and photographs of the seafloor.

A track line defining the proposed cable route from the punchout point seaward was programed into a handheld GPS and served as a guide for the boat captain. Two divers conducted a towed survey behind the boat along the route using a steerable tow board. The third diver using snorkel gear towed on the surface maintaining visual contact with both the boat captain and the divers on the submerged tow board. One diver on the tow board maneuvered the board and remained approximately 5 ft above the seafloor. The second diver recorded video along the entirety of the track and took representative photographs at select locations.

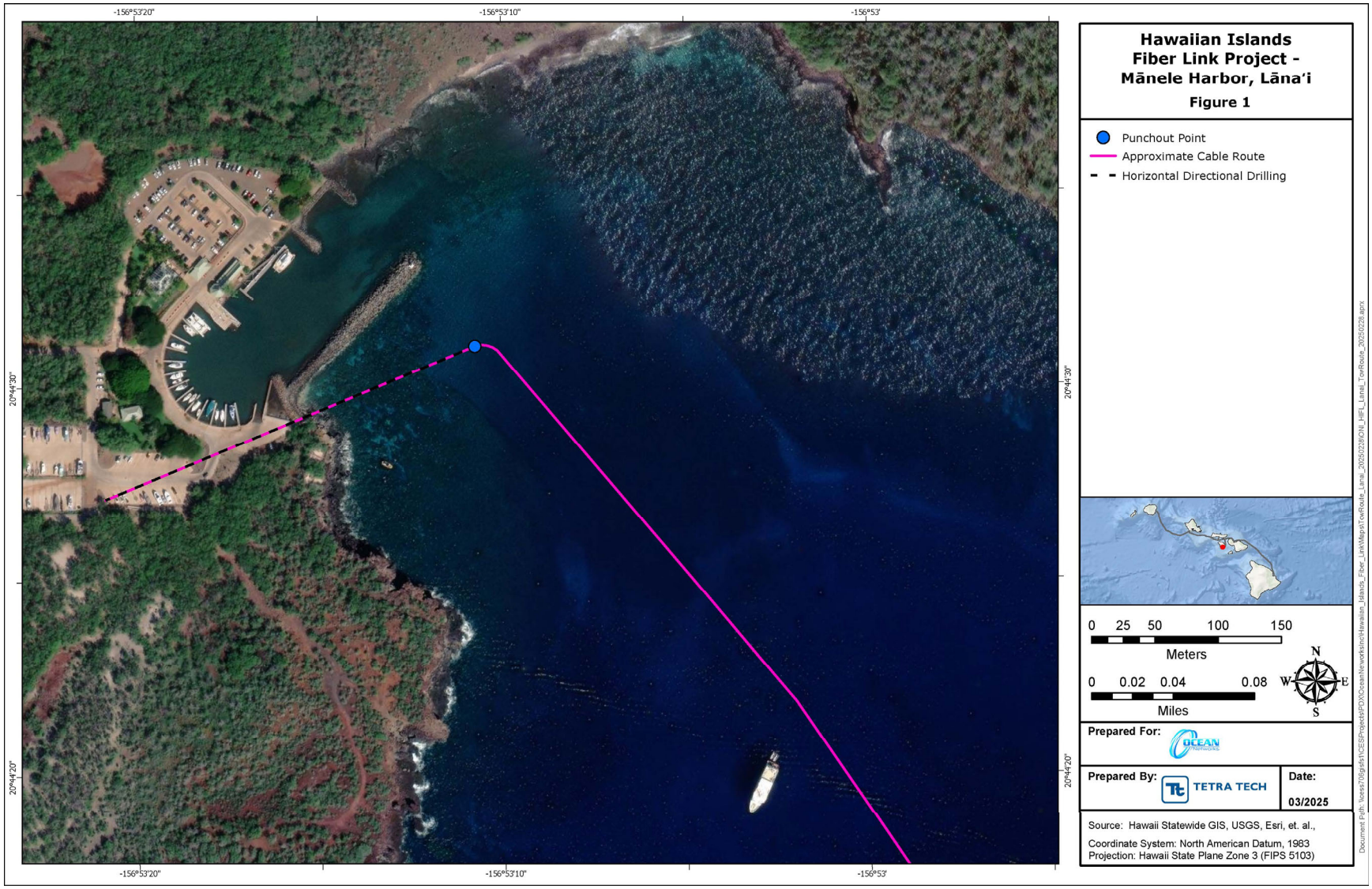


Figure 1 Aerial Photograph of Mānele Harbor and Adjacent Marine Area Showing the Punchout Point and Proposed Cable Route

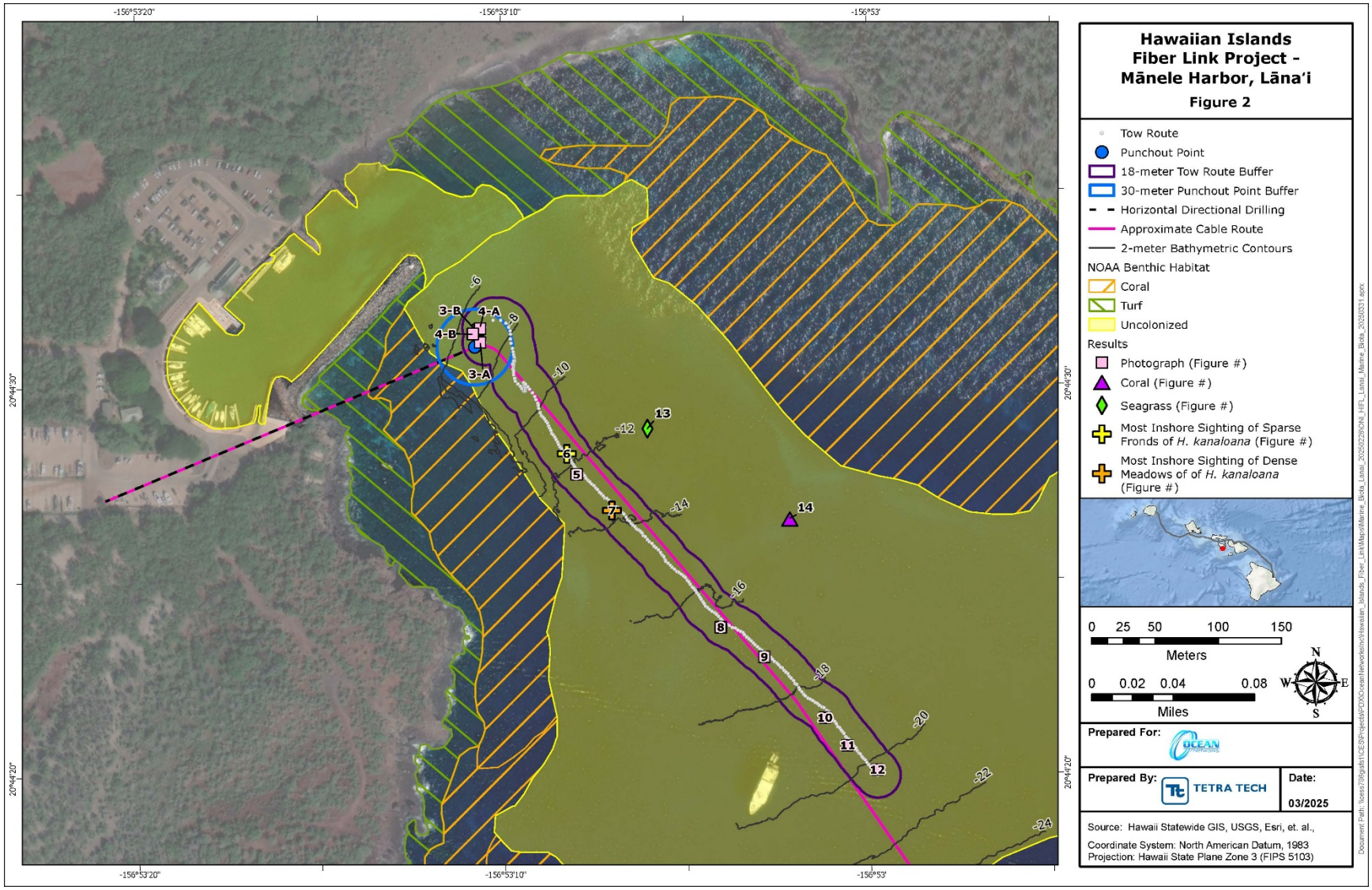


Figure 2 Map Showing Punchout Point, Cable Route, Tow Route with Buffer, and Locations of Significant Biota and Photograph Figures

3 RESULTS

3.1 PUNCHOUT POINT

The entire area within a 30 m radius of the punchout point consisted of a uniform bed of 100% sand. The sand bed was not colonized by any macrobiotic components such as corals, macroalgae, or seagrass (Figure 3 and Figure 4). In addition, fish and other motile organisms were not observed during the survey of the punchout point and surrounding area.

3.2 CABLE ROUTE

Results of the cable route tow survey revealed that the ocean floor was comprised of a uniform bed of sand with varying configurations of sand waves (Figure 5). The first macrobiotic component observed along the route were patches of the green calcareous alga *Halimeda kanaloana,* which were first observed at a depth of 38 ft (Figure 6). Density and frequency of *H. kanaloana* meadows increased with distance from shore. The first large patch of this species was observed at a depth of 44 ft (Figure 7). The alga occurred in varying densities along the remainder of the track with occasional patches on the surface of uncolonized sand beds (Figure 8 to Figure 12).

No corals or seagrass were observed during the tow board surveys along the cable route. However, patches of seagrass (*Halophila* sp.) and small scattered corals were observed at a distance of approximately 150 ft north of the cable route (Figure 14 and Figure 13).

Table 1 shows all species observed in situ and from review of photographs and video collected during the tow along the cable route. No corals, other macroinvertebrates, or seagrass were observed. The only algae detected was *H. kanaloana*, and the only fish detected was a single individual of *Thalassoma duperrey*.

3.3 ADJACENT to CABLE ROUTE

Results of the tow survey conducted on August 7, 2024, provide a description of the marine environment approximately 200 ft north of the cable route. In this area benthic biotic cover was extremely sparse, however, more species were present than along the proposed cable route (Table 1). Six species of corals were documented, although none were present as part of a well-defined reef, and none were larger than approximately 8 inches (Figure 13). A single non-coral invertebrate and three species of fish were detected. Several patches of seagrass were documented in varying densities along the northerly tow route (Figure 14).

4 SUMMARY

Surveys of the punchout point and cable route at Mānele Harbor, Lanai, were conducted in August 2024. Results of the assessment indicate that the punchout point and cable route and adjacent areas within the survey limits consist entirely of sand beds with no hard bottom substrate. No corals, seagrass, or other biota of concern were present along the route. In contrast, a tow survey approximately 200 ft north of the cable route revealed several species of coral as well as patches of seagrass (*Halophila* sp.). Results of the survey indicated that the proposed routing of the cable should not affect any sensitive marine species, seagrass, or coral reefs.

Table 1 All Species Observed During Marine Biota Surveys at the Punchout and along the Cable Route and Adjacent to the Punchout Location and Cable Route

CATEGORY	SPECIES NAME	COMMON NAME	PUNCHOUT	CABLE ROUTE	ADJACENT*
CORAL	*Montipora capitata*	Rice coral	-	-	X
	Montipora patula	Ringed rice coral	-	-	X
	Pocillopora damicornis	Lace coral	-	-	X
	Pocillopora meandrina	Cauliflower coral	-	-	X
	Porites compressa	Finger coral	-	-	X
	Porites lobata	Lobe coral	-	-	X
INVERTEBRATE	*Tripneustes gratilla*	Collector urchin	-	-	X
ALGAE	*Dasya iridescens*	Iridescent seaweed	-	-	X
	Halimeda discoidea	Rosette halimeda	-	-	X
	Halimeda kanaloana	Kanaloa's halimeda	-	X	-
	Neomeris spp.	Finger seaweed	-	-	X
SEAGRASS	*Halophila* sp.	Seagrass	-	-	-
FISH	*Cheilio inermis*	Cigar wrasse	-	-	X
	Oxycheilinus bimaculatus	Two spot wrasse	-	-	X
	Thalassoma duperrey	Saddle wrasse	-	X	X

NOTE: "X" indicates present; "-" indicates not present; "*" indicates survey line conducted ~200 ft north of proposed cable route



Figure 3 Punchout Point, Water Depth of 22 ft

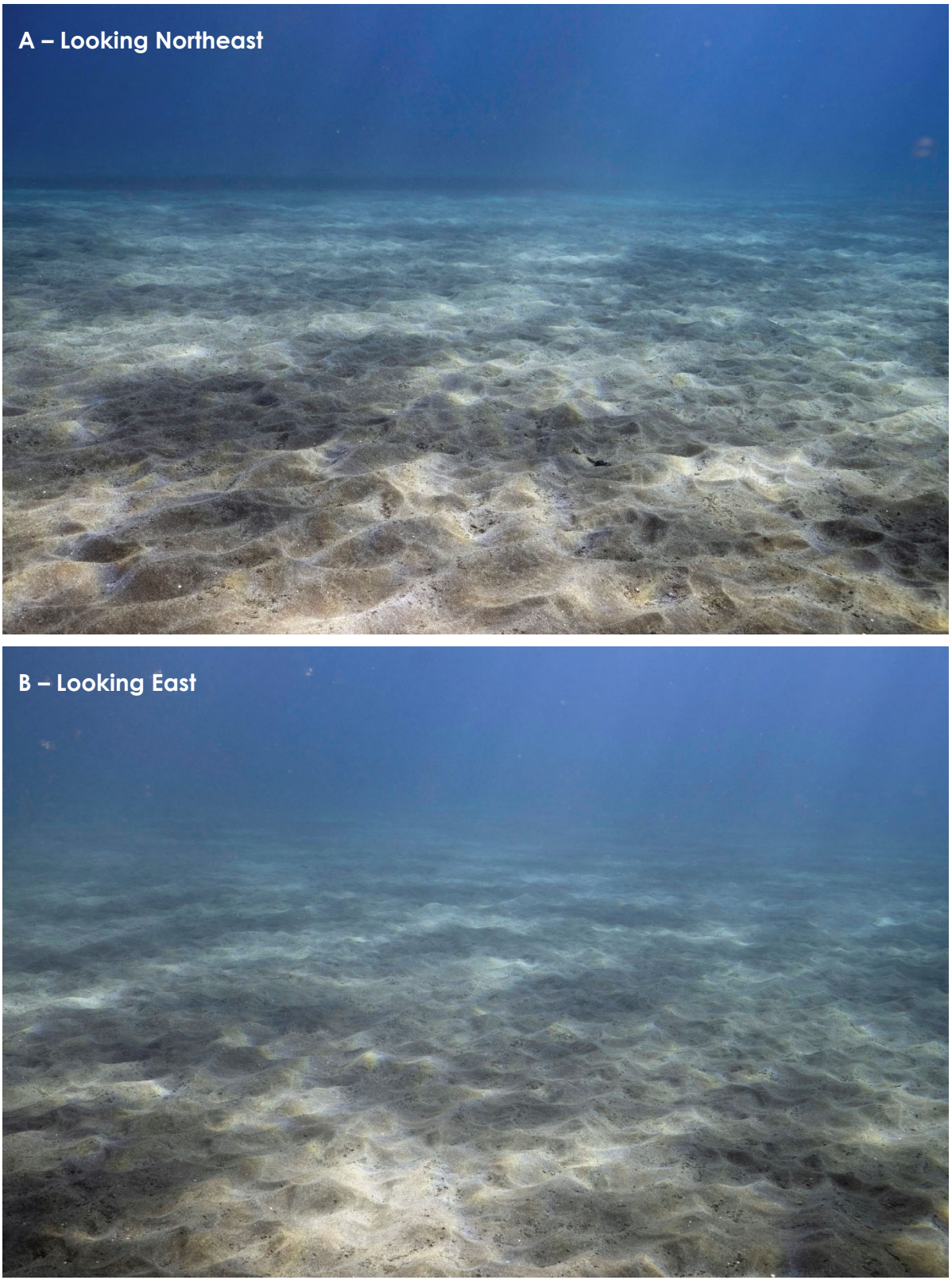


Figure 4 Punchout, Water Depth of 22 ft

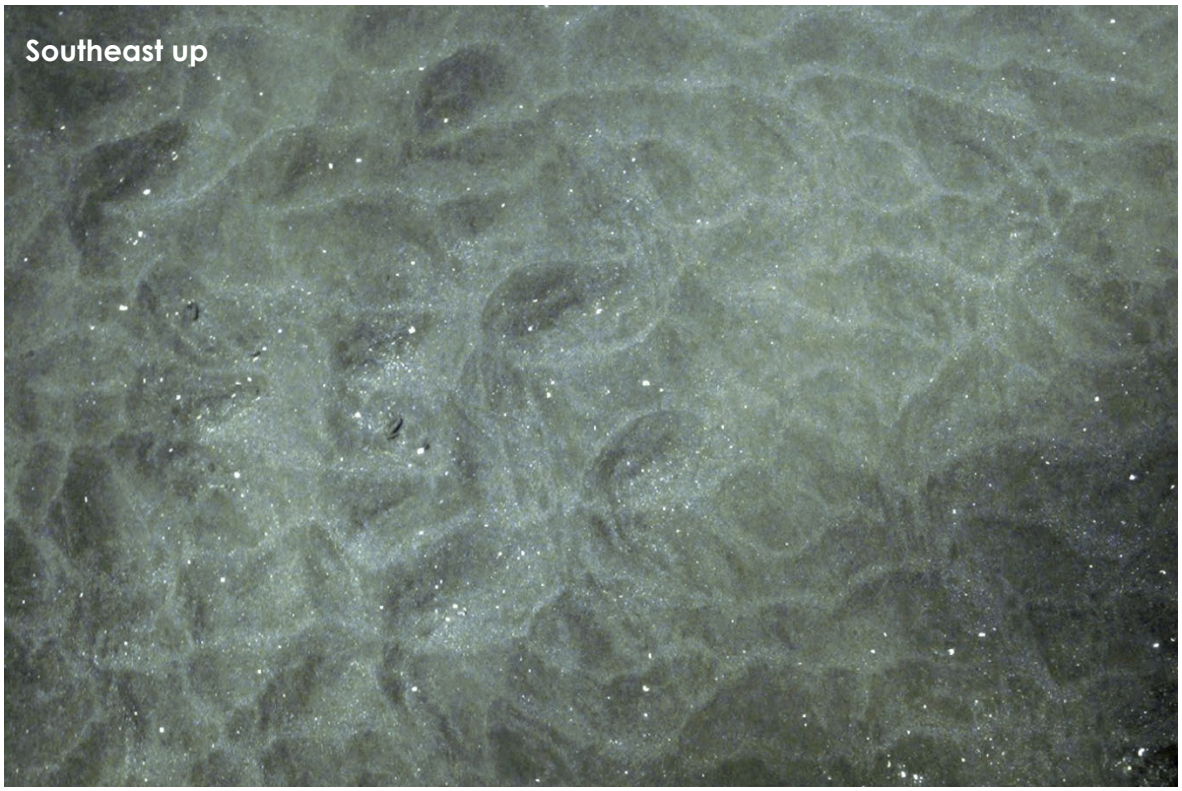


Figure 5 Cable Route, Water Depth of 40 ft

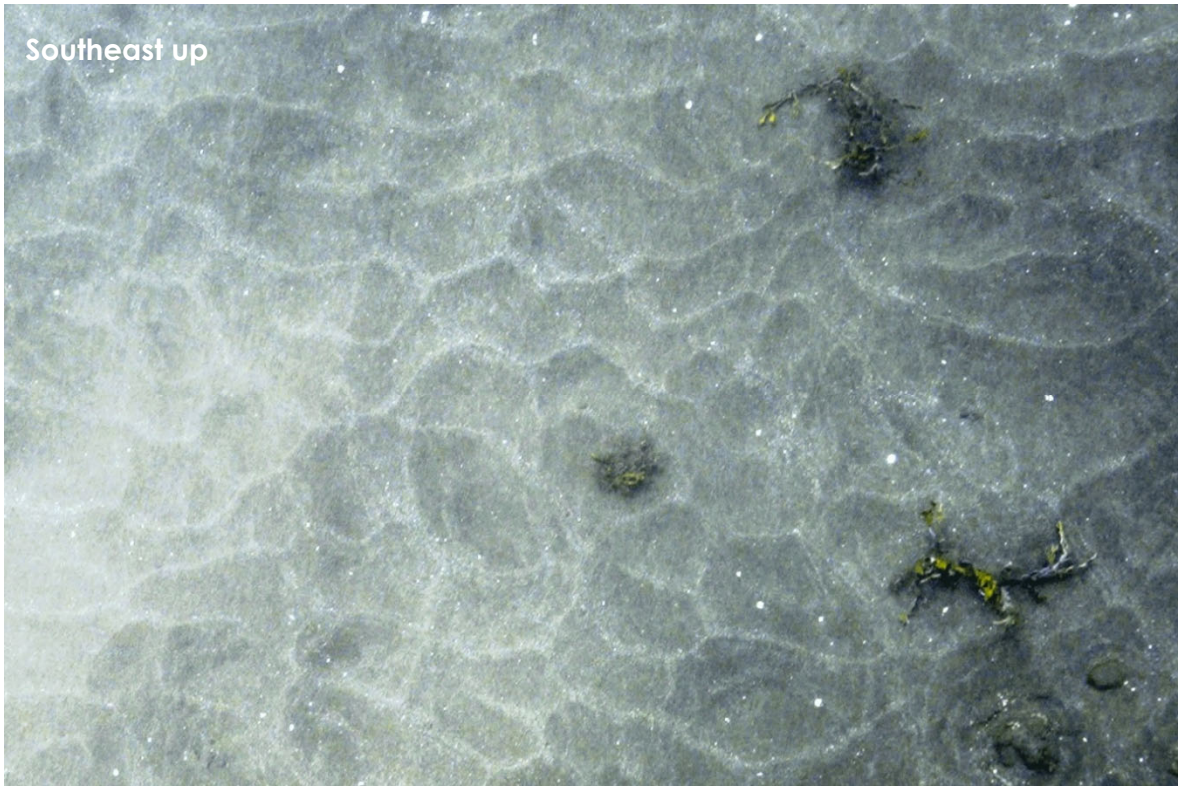


Figure 6 Cable Route, Water Depth of 38 ft, First Observation of *H. kanaloana*

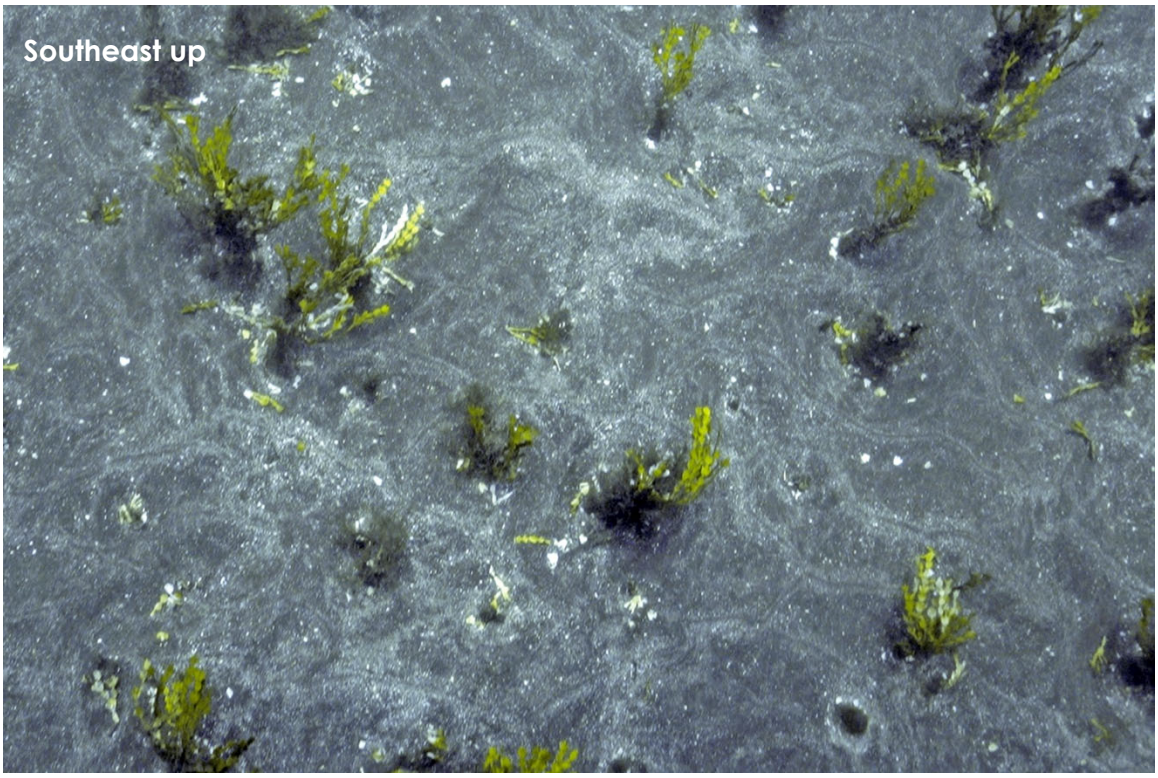


Figure 7 Cable Route, Water Depth of 44 ft

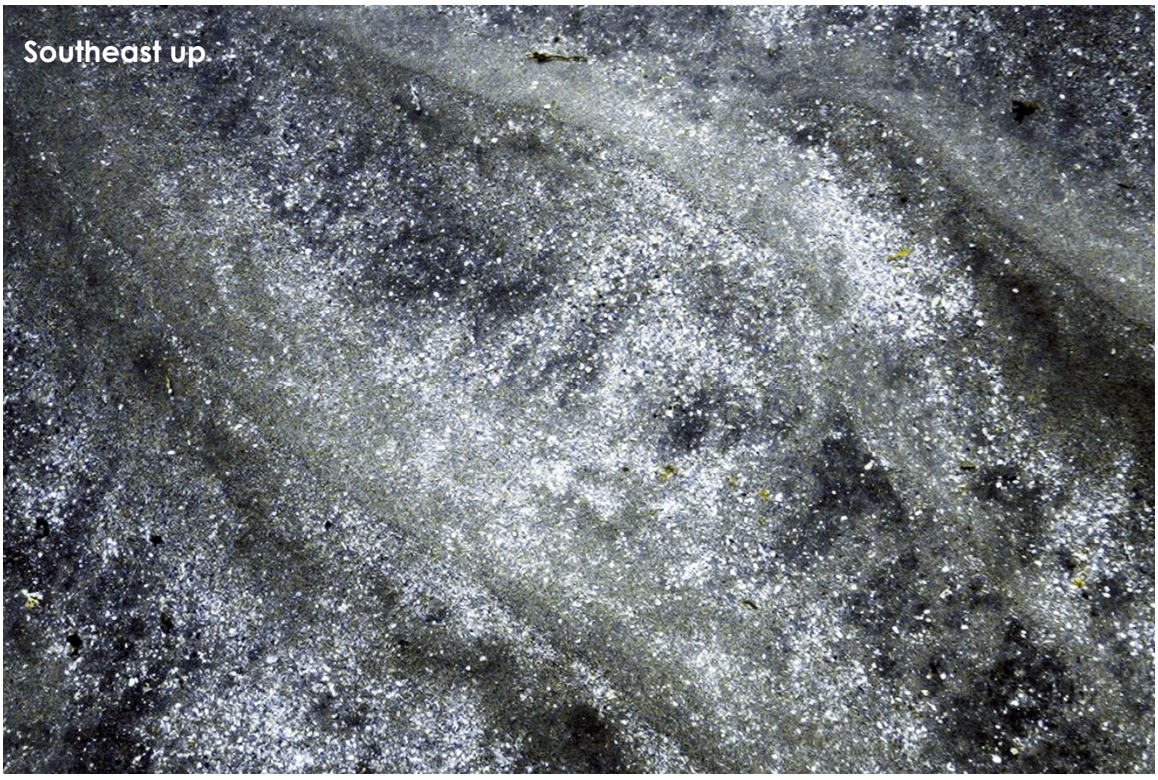


Figure 8 Cable Route, Water Depth of 54 ft

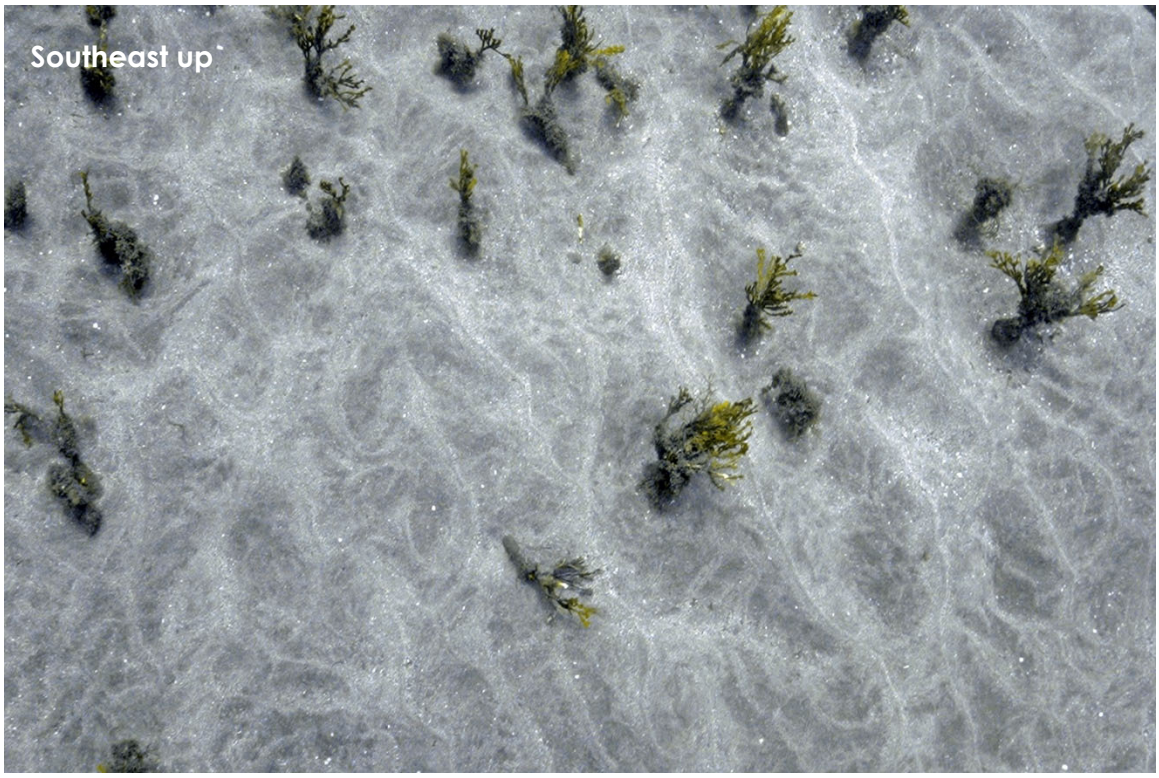


Figure 9 Cable Route, Water Depth of 56 ft

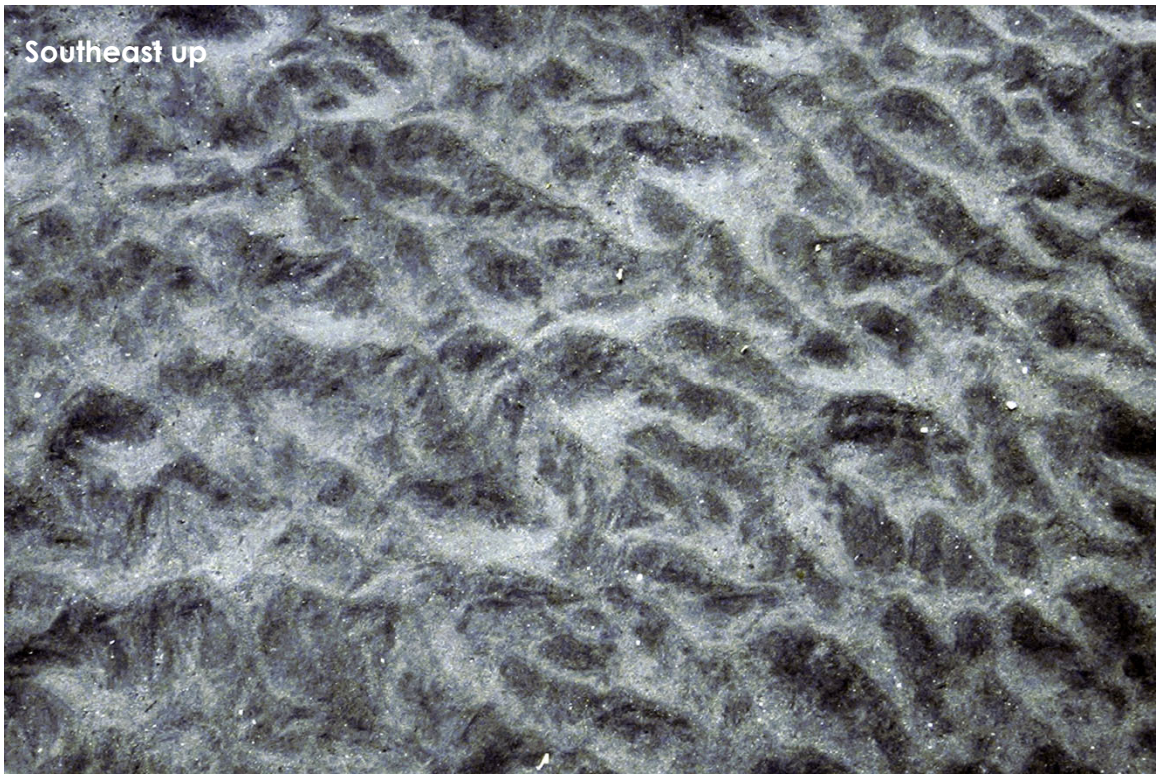


Figure 10 Cable Route, Water Depth of 61 ft

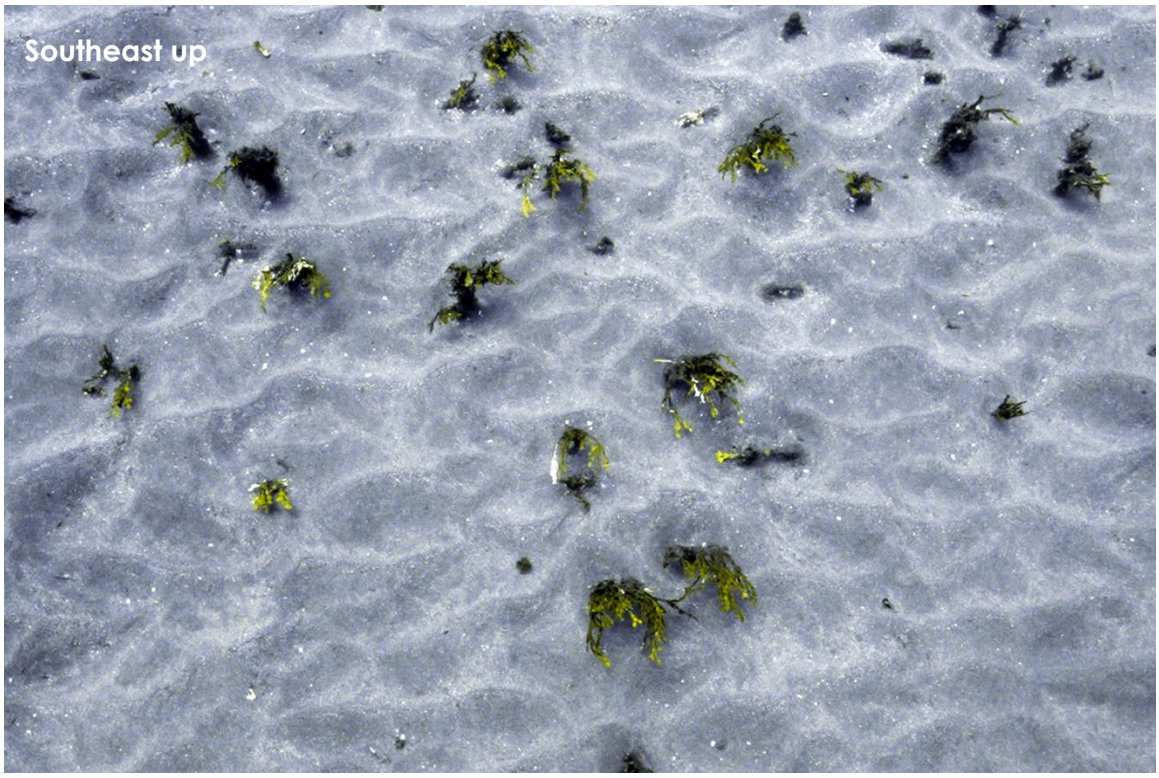


Figure 11 Cable Route, Water Depth of 64 ft

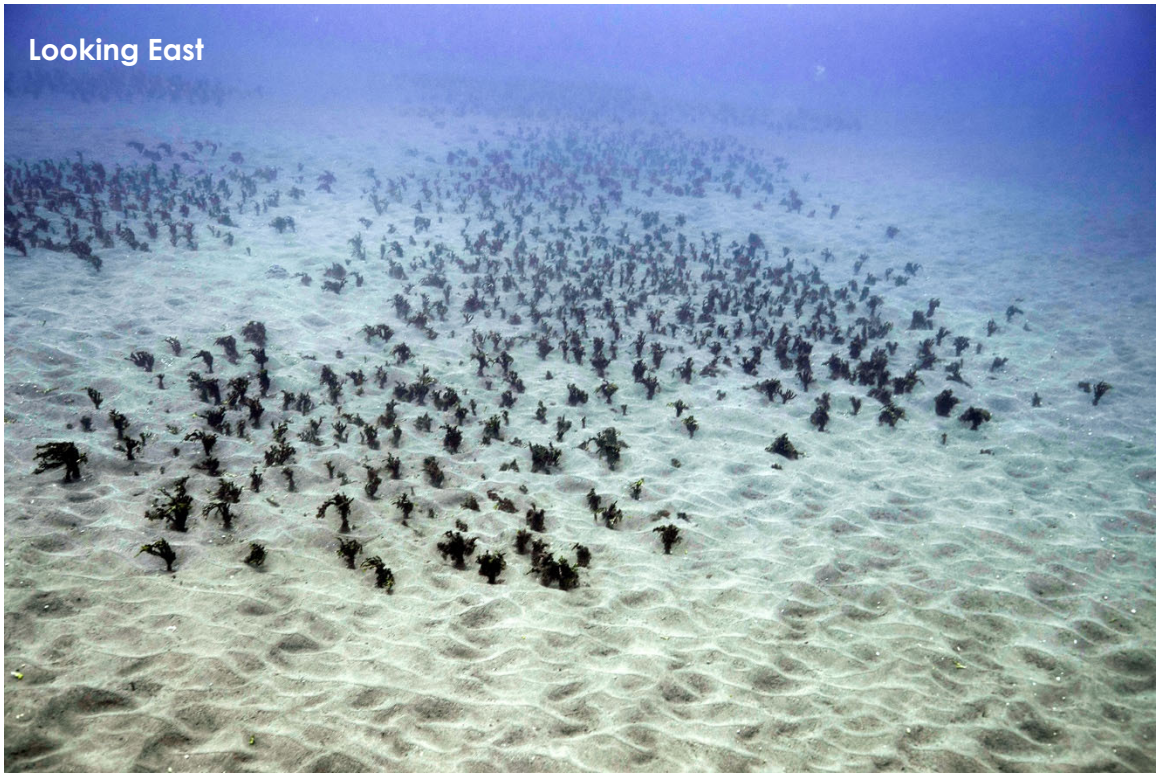


Figure 12 Cable Route, Water Depth of 67 ft



Figure 13 Kanaloana's halimeda (*H. kanaloana*), cauliflower coral (*Pocillopora meandrina*), cigar wrasse (*Cheilio inermis*), and two spot wrasse (*Oxycheilinus bimaculatus*) Approximately 200 ft North of the Cable Route, Water Depth of 51 ft



Figure 14 Patch of Seagrass (*Halophila* sp.) and Kanaloana's halimeda (*H. kanaloana*) Approximately 200 ft North of the Cable Route, Water Depth of 40 ft

MARINE RESEARCH CONSULTANTS, INC.

Marine Biota Survey – Hawaiian Island Fiber Link Project Hilo, Hawai‘i



SUBMITTED TO:
Ocean Networks, INC (ONI)
And Tetra Tech

PREPARED BY:
Marine Research Consultants, Inc.
46-312C Haiku Rd
Kaneohe, HI 96744
808-779-4009

DATE: January 21, 2026

TABLE OF CONTENTS

1 INTRODUCTION 1

2 METHODS 1

2.1 Qualitative Photo Survey – Cable Route 2

2.2 Quantitative Survey – Originally Proposed Punchout Point and Cable Route 2

2.2.1 Percent Cover 2

2.2.2 Coral Size-Class Frequency 3

2.3 Quantitative Survey – Revised Punchout point and Adjacent Areas 3

3 RESULTS 7

3.1 Coral 7

3.2 Non-Coral Invertebrates 8

3.3 Macroalgae 8

3.4 Fish 9

3.5 REVISED PUNCHOUT POINT 9

3.6 CABLE ROUTE: SANDY AREAS AND SAND CHANNELS 9

3.7 CABLE ROUTE: ADJACENT REEF 9

3.7.1 Percent Cover 9

3.7.2 Coral Size-Class Frequency 10

4 SUMMARY 11

List of Figures

Figure 1 Aerial Photograph of Marine Area Offshore of Hilo in Puhi Bay Showing the Proposed Punchout Point, Surface-Laid Cable Route, and NOAA Benthic Habitat Data 5

Figure 2 Map Showing Punchout Point, Surface-Laid Cable Route, Photo Survey Points, and Quantitative Survey Points 6

Figure 3 Representative Images of Biota 18

Figure 4 Site Q14 Revised punchout point, silty sand sediment (depth ~ 18 m) 19

Figure 5 Site Q16, silty sand sediment (depth ~ 18 m); located approximately 50 m offshore of the revised punchout point 19

Figure 6 P02, Sand and Fine Soft Sediment (Depth ~ 17 m); located approximately 15 m inshore of the revised punchout point 20
Figure 7 P03, Sand and Fine Soft Sediment (Depth ~ 17 m) 20
Figure 8 P04, Sand and Fine Soft Sediment (Depth ~ 20 m) 21
Figure 9 P05 (Depth ~ 20 m) 21
Figure 10 P06 (Depth ~ 20 m) 22
Figure 11 P07, Sand and Fine Soft Sediment (depth ~ 20 m) 22
Figure 12 P08 (Depth ~ 19 m) 23
Figure 13 P09 (Depth ~ 20 m) 23
Figure 14 P10 (Depth ~ 17 m) 24
Figure 15 P11 (Depth ~ 18 m) 24
Figure 16 P12 (Depth ~ 18 m) 25
Figure 17 P13 (Depth ~ 19 m) 25
Figure 18 P14 (Depth ~ 21 m) 26
Figure 19 P15 (Depth ~ 22 m) 26
Figure 20 P16 (Depth ~ 23 m) 27
Figure 21 P17 (Depth ~ 27 m) 27

List of Tables

Table 1 GPS Coordinates for all Survey Locations 4
Table 2 All Species of coral, Non-Coral Invertebrates, and Macroalgae Observed During Surveys in Hilo, Hawai'i 13
Table 3 All Species of Fish Observed during Surveys in Hilo, Hawai'i 14
Table 4 Percent Cover of Algae, Abiotic Substrate, and Species of Coral at Quantitative Survey Sites[1] 15
Table 5 Number of Colonies of each Species of Coral Present at Quantitative Sites[1] 16
Table 6 Number of Coral Colonies by Size Class Present at Quantitative Sites[1] 17

1 INTRODUCTION

The State of Hawai'i, represented by the University of Hawai'i (UH) Vice President for Information Technology and Chief Information Officer, is proposing the Hawaiian Islands Fiber Link (HIFL) Project. HIFL is an interisland submarine fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the state. To assist with obtaining the necessary permits for the project, UH has engaged Ocean Networks Inc. (ONI), a private company specializing in the development, operation, and maintenance of submarine fiber optic cables.

The proposed project involves construction, operation, and maintenance of an interisland subsea fiber optic cable system with cable landing sites strategically located on Kaua'i (Nukoli'i Beach), O'ahu (Barbers Point), Maui (Kahului Harbor), Moloka'i (Moloka'i Yacht Club), Lāna'i (Mānele Harbor), and Hawai'i Island (Pacific Aquaculture & Coastal Resource Center, Hilo). The cable, which would have a maximum diameter of approximately 1.5 inches, would be surface laid on the seabed within state and U.S. federal waters to interconnect these sites. At all six cable landing sites, horizontal directional drilling (HDD) would be used to traverse underneath the shoreline to respective offshore punchout locations in the nearshore waters.

Marine Research Consultants, Inc., (MRCI) was contracted by ONI to conduct marine benthic surveys at each of the six cable landing sites. This report presents the results of the in-water survey of the proposed punchout point and surface-laid cable route for the Hilo site. This site located on the northeastern side of the island of Hawai'i in Puhi Bay, which is located along the east side of Hilo Bay (Figure 1).

2 METHODS

Surveys in Puhi Bay on the island of Hawai'i were conducted on July 19 and September 13, 2024, and December 12, 2025. Data was collected at 33 sites, including an originally planned punchout point, a revised punchout point, and along the proposed surface-laid cable route (Figure 2, Table 1). The marine biota assessment surveys were conducted by three marine biologists (S. Dollar, A. Millan, and S. Peltier) using SCUBA working off a small boat.

During the in-water surveys, divers photographed all observed invertebrates, fish, and macroalgae species as well as topographic and structural features and substrate type. Species lists of all biota were tabulated from in situ observations and review of photographs.

2.1 Qualitative Photo Survey – Cable Route

The survey conducted on July 19, 2024, was intended to characterize the seafloor along the proposed surface-laid cable route. During this investigation, a handheld Global Position System (GPS) device (Garmin GPS Map79s) was used to navigate to the coordinates of 17 survey locations (Table 1, Figure 2). Once the dive team reached each pre-selected survey location, a weighted buoy was deployed to mark the site, and divers descended the buoy line. One diver carried a digital camera in an underwater housing and collected representative photographs of the geomorphological structure of the seafloor as well as the resident biota.

2.2 Quantitative Survey – Originally Proposed Punchout Point and Cable Route

A quantitative survey was conducted on September 13, 2024 at 12 sites (Sites Q01-Q12), including the originally proposed punchout point and cable route (Table 1, Figure 2). Although the punchout point was subsequently revised to a location further offshore, the results from this survey have been included to provide a complete picture of the nearshore environment.

Site Q01 was centered at the originally proposed punchout point and was intended to characterize the seafloor and resident biota at the punchout. Sites Q02-Q12 were located along the cable alignment extending from the originally proposed punchout point and were intended to characterize the reef and sand channels along the proposed surface-laid cable route.

During this investigation, the team navigated to each of 12 pre-selected survey locations using a handheld GPS and dropped a weighted buoy at each site (Table 1). Divers placed a quadrat with dimensions of 1 m (3.3 ft) x 0.667 m (2.19 ft) on the benthic surface and used a digital mirrorless camera in an underwater housing to photograph the benthic surface within the bounds of the quadrat. The quadrat was then flipped along one side to capture an adjacent framed area of the benthic surface. This was repeated two more times, alternating sides, resulting in the placement of four quadrats within a 2.67 square-meter (28.7 square-foot) section of the seafloor. A 30-cm metal bar marked in 10-cm increments was placed in each quadrat to provide scale and to indicate north in the resulting images. Images of all quadrats are shown in Appendix A.

2.2.1 Percent Cover

Each quadrat was analyzed for percent cover of biotic and abiotic surface types using point count analysis. At each quadrat, a grid with 25-point intercepts was overlain on the image. Biologists categorized the surface type at each intercept to the most specific level possible for coral and seagrass (if present), while the broader categories of non-coral invertebrate, algae, and abiotic substrate were used for the remaining types of benthic cover. The resulting data set provides percent cover of all resources within the combined four quadrats at each survey site.

2.2.2 Coral Size-Class Frequency

Each set of four quadrats at each of the 12 quantitative survey locations was analyzed for coral size-class frequency. Note that the total area of a four-quadrat set is 2.67 m^2 (28.7 ft^2). Size-class frequency of corals was determined using ImageJ, a public domain Java image-processing program. Every coral colony within each four-quadrat set was identified to the species level and numbered sequentially. The longest diameter of each colony was then measured and binned into one of the following size classes (in cm): 0 – 10, >10 – 20, >20 – 40, >40-80, >80-160, and >160. Results were tabulated using Microsoft Excel and provide a quantitative description of all corals in the vicinity of the Q01-Q12.

2.3 Quantitative Survey – Revised Punchout point and Adjacent Areas

Subsequent to the September 2024 survey, the proposed punchout point was modified to a location further offshore. As such, a follow up quantitative survey was conducted on December 12, 2025 at 4 sites (Sites Q13-Q16) (Table 1, Figure 2). Site Q14 was centered at the revised punchout point and was intended to characterize the seafloor and resident biota at the punchout. Site Q13 was immediately inshore of the revised punchout, and Q15 and Q16 were offshore of the revised punchout point along the proposed surface-laid cable route.

Methods involved navigating to the pre-selected survey locations and dropping a weighted marker with buoy attached. Once the marker was deployed, a diver entered the water with a waterproof GPS and hovered over the weight by pulling the line taut. If necessary, the diver refined the location by moving the weight to the precise location indicated on the GPS. At each survey location, divers swam a 10-m radius around the weighted marker.

The substrate at all four survey locations was sand that was devoid of corals, epibenthic non-coral invertebrates, macroalgae, and seagrass; as such, no quadrat surveys were conducted. Instead, representative images of the geomorphological structure of the seafloor were collected.

Table 1 GPS Coordinates for all Survey Locations

SURVEY DATE/TYPE	NAME	LATITUDE	LONGITUDE	WATER DEPTH (m)
7/19/2024 Photo Survey along Cable Route	P01	19.73323	-155.04747	-7
	P02	19.73367	-155.04734	-17
	P03	19.73458	-155.04660	-20
	P04	19.73611	-155.04609	-20
	P05	19.73682	-155.04595	-21
	P06	19.73708	-155.04580	-20
	P07	19.73771	-155.04581	-19
	P08	19.73884	-155.04559	-19
	P09	19.73899	-155.04558	-16
	P10	19.73928	-155.04529	-16
	P11	19.73956	-155.04497	-17
	P12	19.73959	-155.04504	-19
	P13	19.73997	-155.04464	-19
	P14	19.74030	-155.04443	-21
	P15	19.74060	-155.04426	-22
	P16	19.74092	-155.04415	-23
	P17	19.74132	-155.04417	-27
9/13/2024 Quantitative Survey for Originally Proposed Punchout and Cable Route	Q01 (Originally Proposed Punchout)	19.73218	-155.04753	-1
	Q02	19.73254	-155.04744	-4
	Q03	19.73297	-155.04746	-5
	Q04	19.73334	-155.04745	-7
	Q05	19.73359	-155.04737	-12
	Q06	19.73711	-155.04577	-20
	Q07	19.73843	-155.04585	-17
	Q08	19.73908	-155.04539	-16
	Q09	19.73930	-155.04528	-17
	Q10	19.73945	-155.04516	-18
	Q11	19.73976	-155.04488	-19
	Q12	19.74023	-155.04447	-21
12/12/2025 Quantitative Survey for Revised Punchout and Cable Route	Q13	19.733836	-155.04716	-17
	Q14 (Revised Punchout)	19.733931	-155.04708	-18
	Q15	19.734097	-155.04697	-18
	Q16	19.734314	-155.04680	-18

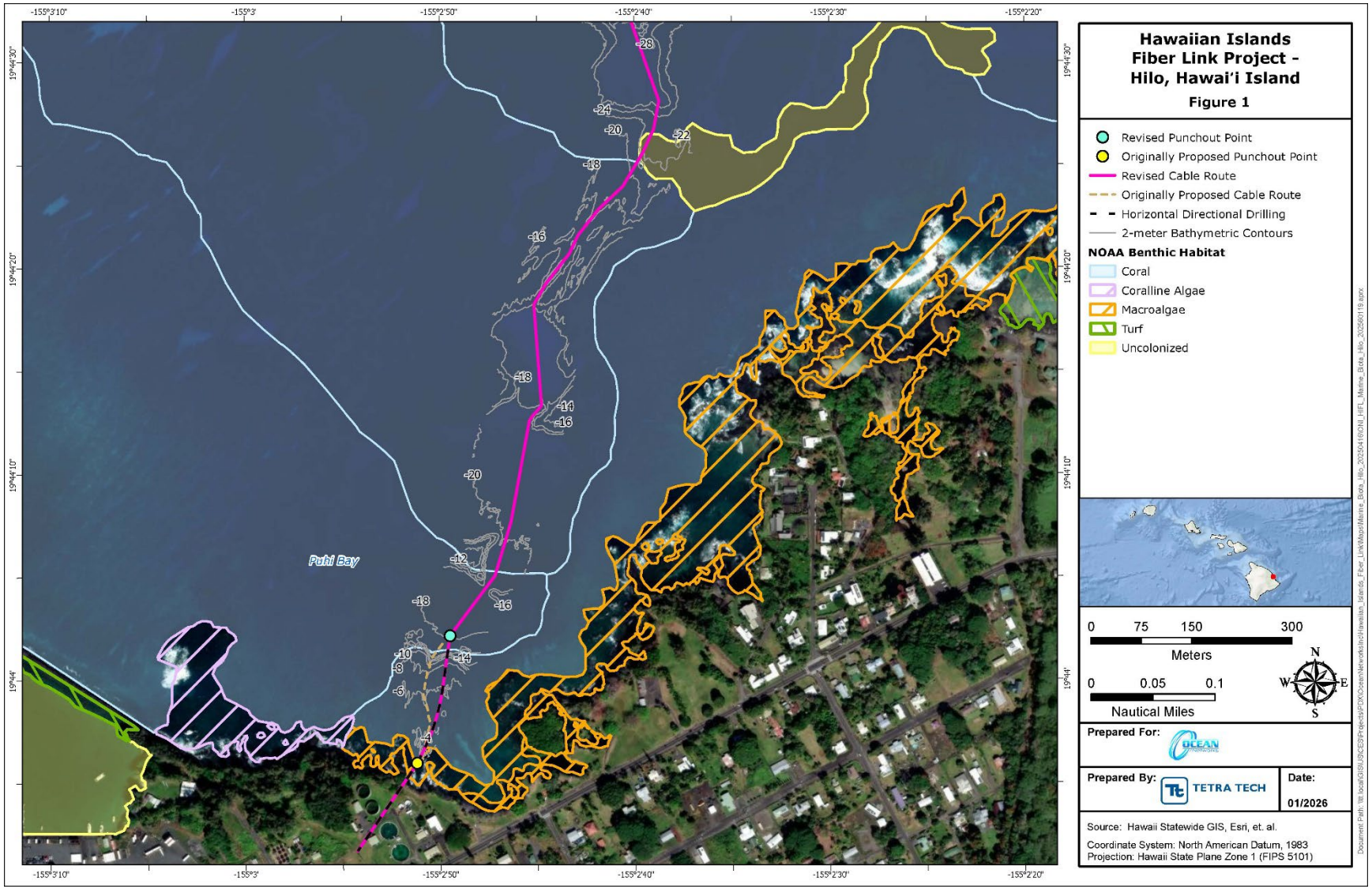


Figure 1 – Aerial Photograph of Marine Area Offshore of Hilo in Puhi Bay Showing the Proposed Punchout Point, Surface-Laid Cable Route, and NOAA Benthic Habitat Data

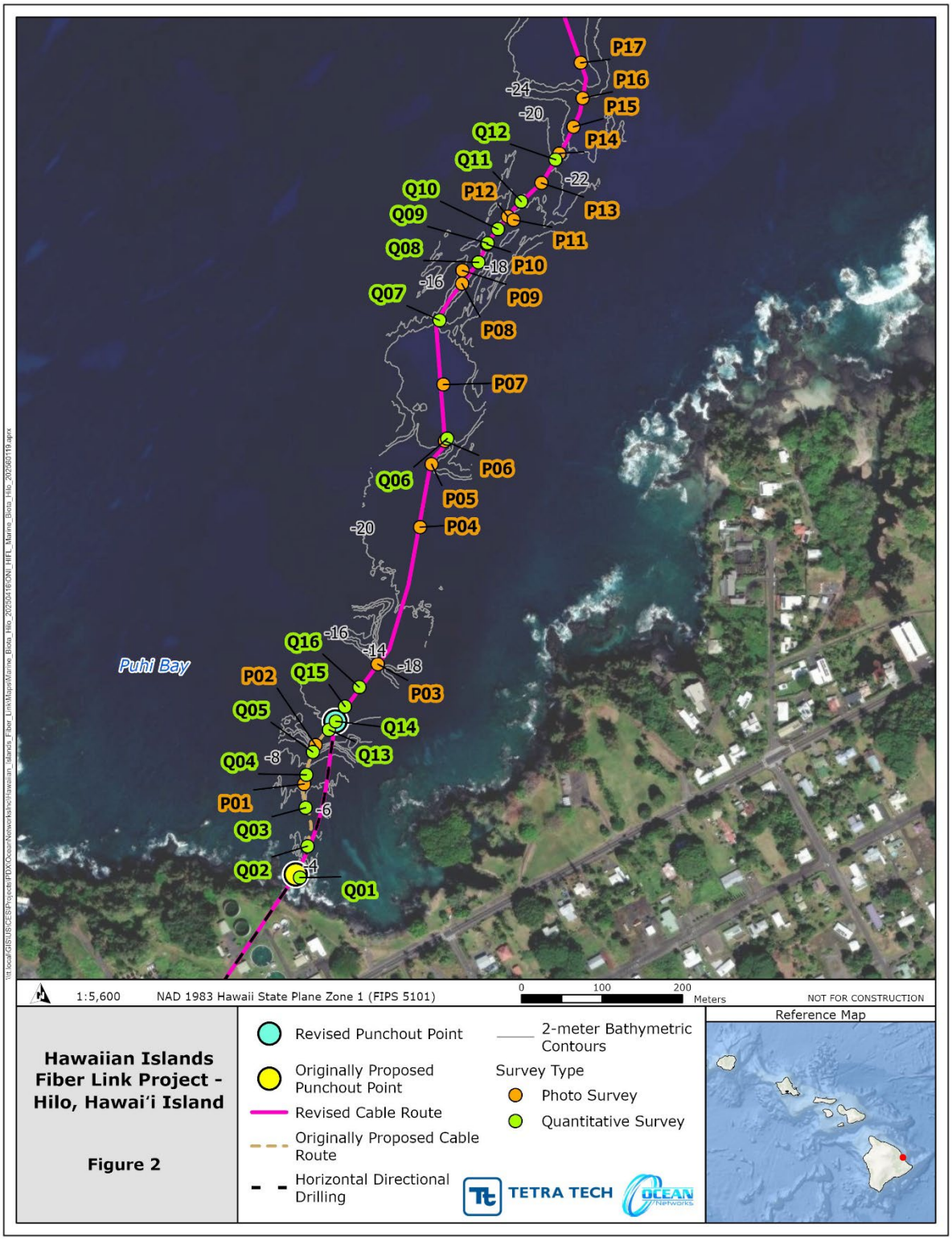


Figure 2 – Map Showing Punchout Point, Surface-Laid Cable Route, Photo Survey Points, and Quantitative Survey Points

3 RESULTS

The shoreline and nearshore area of Puhi Bay in the region of the proposed cable alignment consists of solid surfaces comprised of basaltic boulders and platforms with scattered patches of sand. The revised punchout point is composed entirely of silty sand. Offshore of the revised punchout point, the seafloor consists of elongated coral-covered mounds separated by channels and holes filled with calcareous sand. The tops of the mounds are relatively flat, while the sides slope steeply, sometimes with near vertical faces. It is likely that the mounds originated as basaltic extrusions from lava flows, which are now covered by a veneer of accreted calcium carbonate and living corals. These mounds extended from within approximately 50 m of the shoreline to the outer limits of the survey area.

While the revised punchout point is offshore of P01, P02, and Q01 through Q05, the survey results from those locations are presented below for completeness. However, the reporting is focused on the revised punchout point (Q14) and areas further offshore along the surface-laid cable route.

3.1 Coral

When considering corals in the survey area, branching colonies comprised the dominant growth form closer to shore (i.e., inshore of the revised punchout point), while plating and encrusting growth forms dominated with increasing distance from shore and increasing water depth. Overlapping plates (primarily *Montipora capitata* [rice coral] and *Porites rus* [plate and knob coral]) were the dominant growth form on the steep sides and top surfaces of the mounds. Interconnected mats of branching species (primarily *Porites compressa* [finger coral]) have also colonized the tops of the reef mounds. While coral and macroalgae covered most of the surface of the elevated mounds, the sand channels contained very little visible macrobiota. To the greatest extent feasible, the proposed surface-laid cable route will traverse through the sand channels that separate the hard reef substrate.

Sixteen (16) species of coral and 9 species of non-coral invertebrates were observed during the surveys (Table 2). *Porites rus* was abundant in steeply sloping regions as overlapping plates with small (<15 cm) pillars protruding from the plates. *Montipora capitata* was prevalent on the mounding reefs as overlapping plates and encrustations on the hard substrate. *Porites compressa* was also abundant in hard bottom regions of the survey area. The least commonly observed species of coral were *Gardineroseris planulata* (honeycomb coral, Figure 3A) and *Leptastrea bewickensis* (Bewick's coral).

Inshore of the revised punchout point, the coral community structure can be considered an early phase of Hawaiian reef succession. As the shallow areas are likely subject to periodic destructive wave forces, which are capable of destroying mature colonies, coral cover is lower than in the deeper areas. The predominant coral in the

inshore area is *Pocillopora meandrina*, which is characterized as a "pioneering species." Pioneering species are usually the first species to colonize newly bared substrate and have the capability to settle and grow in habitats that are subject to a degree of wave energy that restricts the colonization of other species. The coral assemblages in the area inshore of the cable route exemplify such an early successional stage of reef development.

The coral community on the reef offshore of the revised punchout point can be considered a climax successional phase of Hawaiian reefs. Living coral cover dominates the hard bottom surfaces with growth forms that are adapted to the physical attributes of the specific marine habitat. These growth forms are predominantly flat encrustations of several species of *Montipora* and *Porites* and interconnected lattices of branching *P. compressa*. Owing to the large size of these colonies and high levels of benthic cover, it is apparent that the coral community has developed without experiencing the force of intermittent destructive disturbances that would place it in a more intermediate stage of succession. As such, the predominant limiting factor of reef growth is available space for further recruitment of a more diverse assemblage of coral species, and the deeper reef represents a mature climax community.

3.2 Non-Coral Invertebrates

Ten (10) species of non-stony coral invertebrates were observed during the surveys (Table 2). With six species, sea urchins were the most commonly represented group of non-coral invertebrates. *Colobocentrotous atratus* (shingle urchins, Figure 3B) were prevalent on the boulders at the waterline in the nearshore zone inshore of the revised punchout point, while the other five species were commonly observed on hard substrate within the range of depths of the survey area. A single species of sea cucumber, several sponges, and a zoanthid comprised the remaining invertebrates observed during the survey.

3.3 Macroalgae

Thirteen (13) species or species groups of macroalgae were identified within the survey area (Table 2). During the surveys conducted in summer and early fall of 2024, a gelatinous red macroalga was prevalent across the survey sites with higher cover noted at survey sites inshore of the revised punchout point. Although this alga could not be positively identified to the species level, it was categorized within the genus *Predaea*. This species is likely a seasonal occurrence and present in much smaller quantities in the cooler seasons. Another group of red alga, crustose coralline algae, was the only other algal group that can be considered abundant within the survey area. Crustose coralline algae commonly colonize the bases of branches of *P. compressa* as well as exposed abiotic hard substrate. Note that *Halophila* spp. (seagrass) was not observed during any of the surveys.

3.4 Fish

Thirty-six (36) species of fish within 12 families were observed during the surveys (Table 3). When considering all families, Acanthuridae (Surgeonfishes) and Chaetodontidae (butterflyfishes) comprised the greatest number of species (8 species each), followed by Labridae (wrasses, 5 species) (Figure 3C). All other families were represented by one or two species. Schools of up to 50 juvenile *Caranx melampygus* (bluefin trevally) traversed the bay and followed divers during the surveys (Figure 3D). Two small schools of *Lutjanus kasmira* (bluestripe snapper) and several individuals of *Cephalopholis argus* (peacock grouper) were observed during the surveys. These species are commonly found on coastal reefs and are considered invasive species in Hawaiian waters.

3.5 REVISED PUNCHOUT POINT

The revised punchout point is approximately 230 m from the shoreline in an area with a silty sand bottom. Divers conducted quantitative surveys at and in the vicinity of the revised punchout (Site Q13; Figure 4). There is no hard bottom habitat within a 10 m radius around the punchout point, and no corals, epibenthic non-coral invertebrates, macroalgae, or seagrass were observed. The only fish observed were two *Upeneus taeniopterus* (bandtail goatfish).

3.6 CABLE ROUTE: SANDY AREAS AND SAND CHANNELS

At 19 representative sites along the cable route, biotic and abiotic composition of the benthic surface was photodocumented (Figure 5 to Figure 21). The route is comprised primarily of sandy areas and sand channels with little to no macrobiotic components. However, several exceptions occur, the first of which is approximately 860 meters from the shoreline (adjacent to Q08-Q11) and the second is approximately 1,100 meters offshore (adjacent to Q12). At these locations sand channels are absent from the consolidated reef structure (Figure 17) and the surface-laid cable will rest on solid reef substrate.

Epibenthic macrobiota in the sandy areas and sand channels was limited to patches of cyanobacteria and regions of dense colonies of chaetopterid (polychaete) worms (Figure 9 and Figure 11). All other invertebrates as well as frondose macroalgae were absent from the sandy areas and sand channels. Mixed schools composed primarily of (Carangids) jacks, (Acanthurids) surgeonfish, (Scarids) parrotfish, and bandtail goatfish were occasionally observed transiting the sand channels between reefs.

3.7 CABLE ROUTE: ADJACENT REEF

3.7.1 Percent Cover

Results of quantitative point count analysis of coral cover conducted at 12 sites (Q01-Q12, see Figure 2) on the reef adjacent to the proposed cable route are shown in Table 4. As noted above, the proposed cable route is designed to minimize contact with the

reef that is represented by these sites. As sites Q13-Q16 were comprised entirely of sand with no reef substrate present, point count analysis of quadrats was not necessary.

In total, 8 species of coral were identified in the quadrats inshore of the revised punchout and 10 species were identified offshore of the revised punchout (Table 4). In general, corals with branching growth forms were more prevalent closer to shore while corals with plating growth forms were more prevalent further from shore.

Inshore of the revised punchout the most prevalent species of coral at the quantitative sites was Porites rus (10.0% of total coral and 39.1% of total coral cover) followed by Porites compressa (8.4% of total coral and 32.8% of total coral cover). When considering the 5 quantitative sites inshore of the revised punchout, coral cover ranged from 0% (Site Q01) to 41% (Site Q04) and averaged 25.6% across all inshore sites. With 7 species, Site Q02 had the greatest diversity of coral.

Montipora capitata (rice coral) was the most prevalent species of coral at the quantitative sites offshore of the revised punchout (44.7% of total bottom cover and 55% of total coral cover) (Table 4). When considering the other 9 species of coral, each species accounted for an average of less than 8.0% of total coral cover. When considering the 7 quantitative sites offshore of the revised punchout, coral cover ranged from 41% (Site Q11) to 83% (Site Q06) and averaged 65.0% across all sites.

The macroalga *Predaea* sp., which was abundant at the time of the September 2024 surveys, grows in between branches and plates of coral and likely reduced the calculated percent cover of coral as the fleshy sheets of the algae extend above living coral tissue. This species was strongly associated with the fine branches of *P. rus* and *P. compressa*, where it has likely attached to the bases of the branches that do not contain living coral tissue. *Predaea* sp. was abundant at sites Q03-Q05 (Appendix A), therefore, coral cover at these sites may be under-reported by an estimated 20%-40%.

3.7.2 Coral Size-Class Frequency

Complete results of coral size-class frequency analysis are shown in Appendix B. Summarized results are shown by species in Table 5 and colony size in Table 6. It is important to note that this data typically represents coral community structure adjacent to the surface-laid cable route. As noted previously, the proposed cable route primarily utilizes sand channels and minimizes contact with the raised reef. From the revised punchout point and areas immediately offshore of the punchout, sandy areas and sand channels that bisect areas of hard reef substrate are relatively common, and the surface-laid cable route will utilize these channels to avoid hard reef substrate to the extent feasible. The seafloor adjacent to the sand channels within this deeper region is represented by sites Q06-Q12.

In total, 388 coral colonies were enumerated at the quantitative sites. With 125 colonies (32% of all colonies) across all sites, *Porites rus* (plate and pillar coral) was the most commonly observed species of coral at the quantitative survey sites (Table 5). Also

commonly observed were *P. compressa* (finger coral, 95 colonies, 24% of total) and *M. capitata* (rice coral, 69 colonies, 18% of total).

In total, 12 species of coral were present at the quantitative sites (Table 5). The average number of species present at each site was 4.4 inshore of the revised punchout and 4.9 offshore of the revised punchout. The range in the number of species at each site was 0 (Q01 [originally proposed punch out] and Q13-Q16) to 10 (Q02, inshore of the revised punchout point).

Of the 388 coral colonies enumerated at the quantitative sites, the most abundant size class was >10-20 cm (111 colonies) followed by >5-10 cm (91 colonies) and >0-5 cm (83 colonies) (Table 6). Corals less than 40 cm in longest diameter accounted for ~86% of all colonies. Q02 had both the greatest number of colonies overall (96) as well as the greatest number of colonies in the smallest size class of >0-5 cm (48). Excluding Q01 and Q13-Q16, which did not have any coral present, average colony size increased with increasing distance from shore.

The number of colonies by species (Table 5) and by size class (Table 6) at sites Q01-Q05 (inshore of the revised punchout point) was averaged and compared to the same data for sites Q06-Q12 (offshore of the revised punchout point). Several differences in coral community structure are evident between the shallow and deep sites. Plating and branching colonies of *Porites rus* (plate and knob coral) and branching colonies of *P. compressa* (finger coral) were the dominant species at the shallow sites, while plating and encrusting colonies of *M. capitata* (rice coral) were dominant at the deeper sites.

Coral size class frequency for sites Q01-Q05 was averaged and compared to the same data for sites Q06-Q12 (Table 6). Review of this data reveals that the density of larger (>20 cm) is greater at the deeper sites (10 colonies at deeper sites and 6 colonies at shallower sites). However, the difference in the density of smaller (<20 cm) corals is more pronounced. On average, Sites Q01-Q05 contain 41 colonies <20 cm in longest diameter, while Sites Q06-Q12 contain 11 corals <20 cm.

4 SUMMARY

Surveys of the surface-laid cable route in Puhi Bay, Hilo, Hawai'i were conducted in July 2024, September 2024, and December 2025. Thirty-three (33) sites were surveyed between the shoreline and offshore waters to a water depth of ~27 m. The revised punchout point is in an area with silty sand that is free of corals, epibenthic non-coral invertebrates, macroalgae, and seagrass. Seaward of the revised punchout point, the marine environment consists primarily of a series of elongated mounds separated by channels and holes filled with sand. The edges of the mounds form steep faces, many of which are nearly vertical. The upper surfaces of the mounds are covered to a large extent with corals, particularly large colonies with both encrusting and branching

growth forms. The steep sides of the mounds are colonized with corals that have overlapping plating growth forms. While benthic macroalgae was abundant on the reef mounds, no seagrass was observed along or adjacent to the cable route.

It is anticipated that the cable will follow a route through the sand channels to the greatest extent feasible. As the sand channels are mostly devoid of any visible macrobiotic epifauna, such routing should minimize the potential effects to marine resources. In areas where the reef forms a solid surface structure without intervening sand channels, it is anticipated that placement of the cable will be directed by divers to avoid and minimize contact with living corals to the greatest degree feasible. In the event that the cable will need to be placed in contact with living corals, it is likely that any damage to these colonies will be temporary. Any loss of living tissue from cable installation will likely be minor in extent and will recover.

Table 2 All Species of coral, Non-Coral Invertebrates, and Macroalgae Observed During Surveys in Hilo, Hawai'i

CATEGORY	SPECIES	COMMON NAME	PO	SC	Reef
STONY CORALS	*Gardineroseris planulata*	Honeycomb coral	-	-	R
	Leptastrea bewickensis	Bewick's coral	-	-	R
	Leptastrea purpurea	Crust coral	-	-	R
	Leptastrea transversa	Transverse coral	-	-	R
	Lobactis scutaria	Mushroom coral	-	-	R
	Montipora capitata	Rice coral	-	-	A
	Montipora flabellata	Blue rice coral	-	-	R
	Montipora patula	Ringed rice coral	-	-	A
	Pavona duerdeni	Porkchop coral	-	-	R
	Pavona varians	False brain coral	-	-	C
	Pocillopora damicornis	Lace coral	-	-	R
	Pocillopora meandrina	Cauliflower coral	-	-	C
	Porites compressa	Finger coral	-	-	A
	Porites evermanni	Brown lobe coral	-	-	C
	Porites lobata	Lobe coral	-	-	A
	Porites rus	Plate and pillar coral	-	-	A
NON-STONY CORAL INVERTEBRATES	*Actinopyga varians*	White-spotted sea cucumber	-	-	R
	Chaetopteridae	Polychaete worm	-	A	-
	Clathria spp.	Clathria sponge	-	-	C
	Colobocentrotus atratus	Shingle urchin	-	-	R
	Diadema savignyi	blue-lined long spine urchin	-	-	C
	Echinometra mathaei	Pale rock-boring urchin	-	-	C
	Echinothrix calamaris	Banded urchin	-	-	C
	Heterocentrotus mamillatus	Slate pencil urchin	-	-	C
	Palythoa tuberculosa	Rubbery zoanthid	-	-	R
	Porifera	Sponge	-	-	C
	Tripneustes gratilla	Collector urchin	-	-	C
ALGAE	Crustose coralline algae	Crustose coralline algae	-	-	A
	Cyanobacteria	Blue-green algae	-	A	C
	Halimeda discoidea	Rosette halimeda	-	-	R
	Halimeda opuntia	Prickly pear seaweed	-	-	C
	Hydrolithon spp.	Encrusting coralline algae	-	-	C
	Lithophyllum kotschyanum	Stubby coralline algae	-	-	C
	Lobophora variegata	Variegated seaweed	-	-	C
	Lyngbya majuscula	Stinging limu	-	-	R
	Peyssonnelia spp.	Dark red coralline algae	-	-	C
	Pneophyllum conicum	Crustose coralline algae	-	-	R
	Portieria hornemannii	Hornemann's seaweed	-	-	C
	Predaea sp.	Gelatinous red algae	-	-	A
	Predaea weldii	Gelatinous seaweed	-	-	R
	Sporolithon spp.	Patchy red coralline algae	-	-	C

NOTES: "PO" = Revised Punchout; "SC" = Sand Channels; "R" = Rare, "C" = Common, and "A" = Abundant within survey area.

Table 3 All Species of Fish Observed during Surveys in Hilo, Hawai'i

FAMILY - SPECIES	COMMON NAME	ABUNDANCE
Acanthuridae (Surgeonfishes)		
Acanthurus achilles	Achilles tang	C
Acanthurus blochii	Ringtail surgeonfish	C
Acanthurus leucopareius	Whitebar surgeonfish	C
Acanthurus nigrofuscus	Brown surgeonfish	A
Acanthurus triostegus	Convict tang	A
Acanthurus xanthopterus	Yellowfin surgeonfish	C
Ctenochaetus strigosus	Goldring surgeonfish	C
Naso lituratus	Orangespine unicornfish	R
Zebrasoma flavescens	Yellow tang	C
Balistidae (Triggerfishes)		
Melichthys niger	Black triggerfish	C
Sufflamen bursa	Lei triggerfish	C
Carangidae (Jacks)		
Caranx melampygus	Bluefin trevally	A
Chaetodontidea (Butterflyfishes)		
Chaetodon auriga	Threadfin butterflyfish	C
Chaetodon lunula	Oval butterflyfish	R
Chaetodon milliaris	Milletseed butterflyfish	R
Chaetodon multicinctus	Multiband butterflyfish	C
Chaetodon ornatissimus	Ornate butterflyfish	C
Chaetodon quadrimaculatus	Fourspot butterflyfish	R
Chaetodon unimaculatus	Teardrop butterflyfish	R
Forcipiger flavissimus	Forcepsfish	C
Holocentridae (Squirrelfishes and Soldierfishes)		
Neoniphon sammara	Spotfin squirrelfish	R
Labridae (Wrasses)		
Bodianus albotaeniatus	Hawaiian hogfish	R
Gomphosus varius	Bird wrasse	C
Labroides phthirophagus	Hawaiian cleaner wrasse	C
Oxycheilinus unifasciatus	Ringtail wrasse	R
Thalassoma duperrey	Saddle wrasse	A
Lethrinidae (Emporers)		
Monotaxis grandoculis	Bigeye emperor	R
Lutjanidae (Snapper)		
Lutjanus fulvus	Blacktail snapper	C
Lutjanus kasmira	Bluestripe snapper	C
Mullidae (Goatfishes)		
Parupeneus insularis	Doublebar goatfish	C
Parupeneus multifasciatus	Manybar goatfish	C
Upeneus taeniopterus	Bandtail goatfish	R
Pomocentridae (Damselfishes)		
Abudefduf sordidus	Blackspot sergeant	C
Plectroglyphidodon imparipennis	Bright-eye damselfish	C
Serranidae (Groupers)		
Cephalopholis argus	Peacock grouper	C
Tetraodontidae (Pufferfishes)		
Canthigaster amboinensis	Ambon puffer	R
Canthigaster jactator	Hawaii whitespotted puffer	C

NOTES: "R" = Rare, "C" = Common, and "A" = Abundant within survey area.

Table 4 Percent Cover of Algae, Abiotic Substrate, and Species of Coral at Quantitative Survey Sites[1]

CORAL SPECIES	Inshore of Revised Punchout						Offshore of Revised Punchout							
	Q01	Q02	Q03*	Q04*	Q05*	AVG	Q06	Q07	Q08	Q09	Q10	Q11	Q12	AVG
Leptastrea purpurea	-	-	-	-	-	**-**	-	-	-	1	-	-	-	**0.1**
Leptastrea transversa	-	-	-	-	-	**-**	-	-	6	-	5	-	-	**1.6**
Lobactis scutaria	-	1	-	-	-	**0.2**	-	-	-	-	-	-	-	**-**
Montipora capitata	-	5	-	-	-	**1.0**	60	34	48	62	33	7	69	**44.7**
Montipora patula	-	2	-	-	-	**0.4**	2	1	7	-	4	-	1	**2.1**
Pavona duerdeni	-	-	-	-	-	**-**	-	-	-	-	-	1	-	**0.1**
Pavona varians	-	-	-	-	-	**-**	2	1	3	1	1	1	-	**1.3**
Pocillopora damicornis	-	1	-	-	-	**0.2**	-	-	-	-	-	-	-	**-**
Pocillopora meandrina	-	3	1	-	2	**1.2**	-	-	2	-	-	-	-	**0.3**
Porites compressa	-	-	22	7	13	**8.4**	2	21	-	4	-	29	-	**8.0**
Porites lobata	-	1	-	13	7	**4.2**	-	3	10	2	10	3	2	**4.3**
Porites rus	-	12	11	21	6	**10.0**	17	-	-	-	-	-	-	**2.4**
ALL CORAL	**-**	**25**	**34**	**41**	**28**	**25.6**	**83**	**60**	**76**	**70**	**53**	**41**	**72**	**65.0**
ALL ALGAE	**17**	**44**	**61**	**56**	**70**	**49.6**	**12**	**37**	**18**	**17**	**29**	**45**	**11**	**24.1**
ALL ABIOTIC SUBSTRATE	**83**	**31**	**5**	**3**	**2**	**24.8**	**5**	**3**	**6**	**13**	**18**	**14**	**17**	**10.9**

NOTES:

[1] Sites Q13-Q16 were comprised entirely of sand with no reef substrate, therefore quadrat surveys were not conducted, and data for these sites is not included in this table.

"" denotes sites with substantial coverage of* Predaea *sp. that is likely partially obscuring living coral tissue.*

Table 5 Number of Colonies of each Species of Coral Present at Quantitative Sites[1]

SPECIES	Inshore of Revised Punchout						Offshore of Revised Punchout and Adjacent to Cable Route								TOTAL
	Q01	Q02	Q03	Q04	Q05	Avg.	Q06	Q07	Q08	Q09	Q10	Q11	Q12	Avg.	
Leptasrea transversa	-	-	-	-	-	0.0	-	-	1	-	4	-	-	0.7	5
Lobactis scutaria	-	4	-	-	-	0.8	-	-	-	-	-	-	-	0.0	4
Montipora capitata	-	3	-	-	-	0.6	5	12	17	7	9	7	9	9.4	69
Montipora patula	-	1	2	-	-	0.6	-	2	3	1	3	-	-	1.3	12
Pavona duerdeni	-	-	-	-	-	0.0	-	-	-	-	-	1	-	0.1	1
Pavona maldivensis	-	4	-	-	-	0.8	2	-	-	-	-	-	-	0.3	6
Pavona varians	-	6	-	-	1	1.4	7	1	3	4	2	-	-	2.4	24
Pocillopora damicornis	-	4	-	-	-	0.8	-	-	-	-	-	-	-	0.0	4
Pocillopora meandrina	-	2	1	-	1	0.8	-	-	1	-	-	-	-	0.1	5
Porites compressa	-	1	24	20	28	14.6	3	8	-	7	1	3	-	3.1	95
Porites lobata	-	12	-	2	7	4.2	1	3	3	3	3	3	1	2.4	38
Porites rus	-	59	29	17	10	23.0	10	-	-	-	-	-	-	1.4	125
NUMBER OF SPECIES	**-**	**10**	**4**	**3**	**5**	4.4	**6**	**5**	**6**	**5**	**6**	**4**	**2**	4.9	**12**
NUMBER OF COLONIES	**-**	**96**	**56**	**39**	**47**	47.6	**28**	**26**	**28**	**22**	**22**	**14**	**10**	21.4	**388**

NOTES:

"Avg." = Average.

[1] Sites Q13-Q16 were comprised entirely of sand with no reef substrate, therefore quadrat surveys were not conducted, and data for these sites is not included in this table.

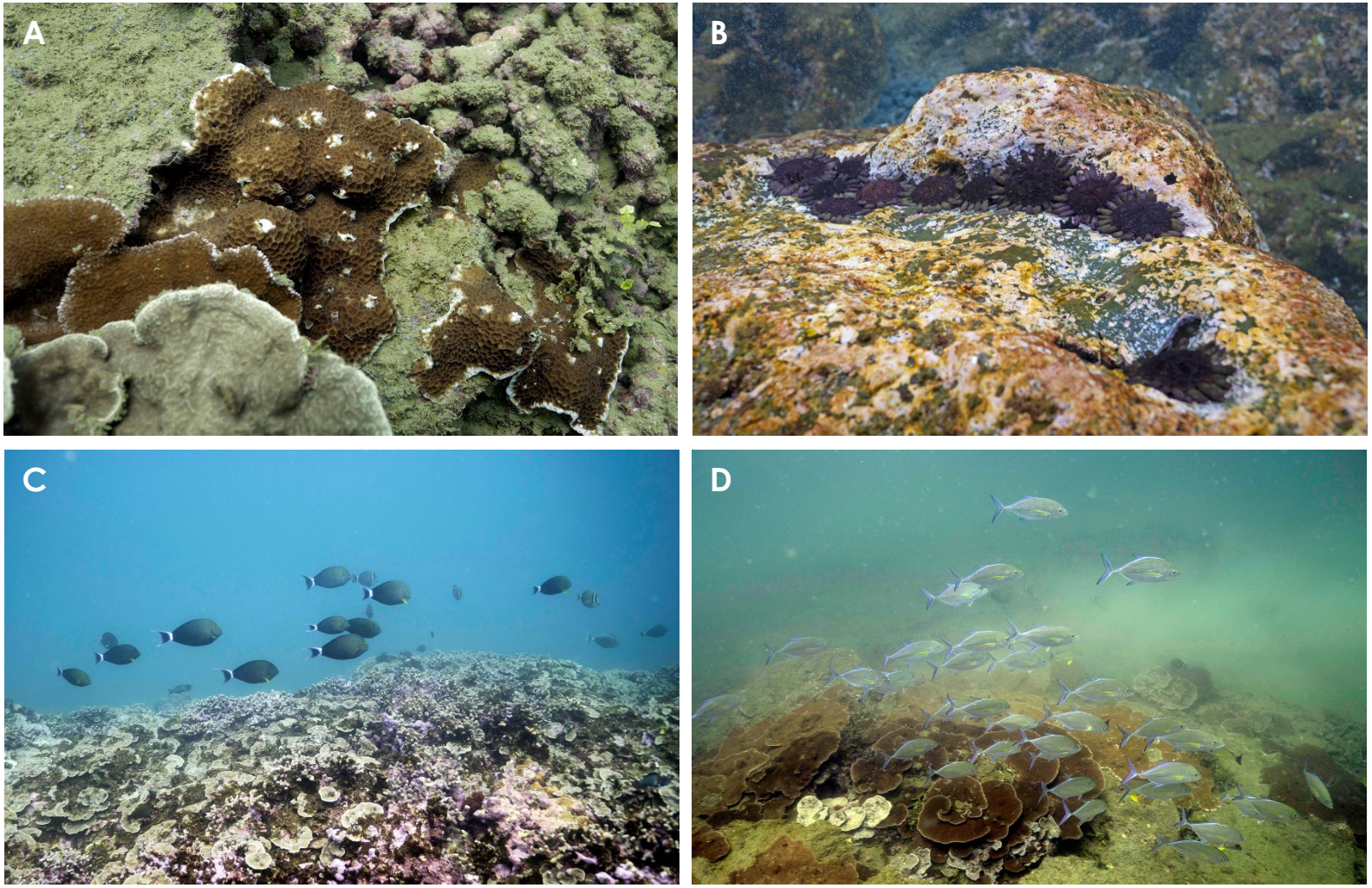
Table 6 Number of Coral Colonies by Size Class Present at Quantitative Sites[1]

SIZE CLASS (cm)	Inshore of Revised Punchout						Offshore of Revised Punchout and Adjacent to Cable Route								TOTAL
	Q01	Q02	Q03	Q04	Q05	Avg.	Q06	Q07	Q08	Q09	Q10	Q11	Q12	Avg.	
>0 – 5	-	48	4	6	14	**14.4**	1	1	1	5	3	-	-	**1.6**	**83**
>5 – 10	-	29	13	10	14	**13.2**	8	3	3	5	2	4	-	**3.6**	**91**
>10 – 20	-	13	27	12	15	**13.4**	8	9	4	8	7	4	4	**6.3**	**111**
>20 – 40	-	3	9	7	2	**4.2**	2	5	16	3	6	3	2	**5.3**	**58**
>40 - 80	-	3	2	3	2	**2.0**	5	7	3	-	3	-	2	**2.9**	**30**
>80 - 160	-	-	1	1	-	**0.4**	4	1	1	-	1	3	2	**1.7**	**14**
>160	-	-	-	-	-	**0.0**	-	-	-	1	-	-	-	**0.1**	**1**
ALL	**-**	**96**	**56**	**39**	**47**	**47.6**	**28**	**26**	**28**	**22**	**22**	**14**	**10**	**21.4**	**388**

NOTES:

"Avg." = Average.

[1] Sites Q13-Q16 did not have any visible macrobiota, therefore quadrat surveys were not conducted, and data for these sites is not included in this table.



NOTES: A – *Gardineroseris planulata* (honeycomb coral); B – *Colobocentrotus atratus* (shingle urchin); C – *Acanthurus xanthopterus* (yellowfin surgeonfish), *A. leucopareius* (whitebar surgeonfish), *Naso lituratus* (orangespine unicornfish), and *Thalassoma duperrey* (saddle wrasse); and D – *Caranx melampygus* (bluefin trevally)

Figure 3 – Representative Images of Biota

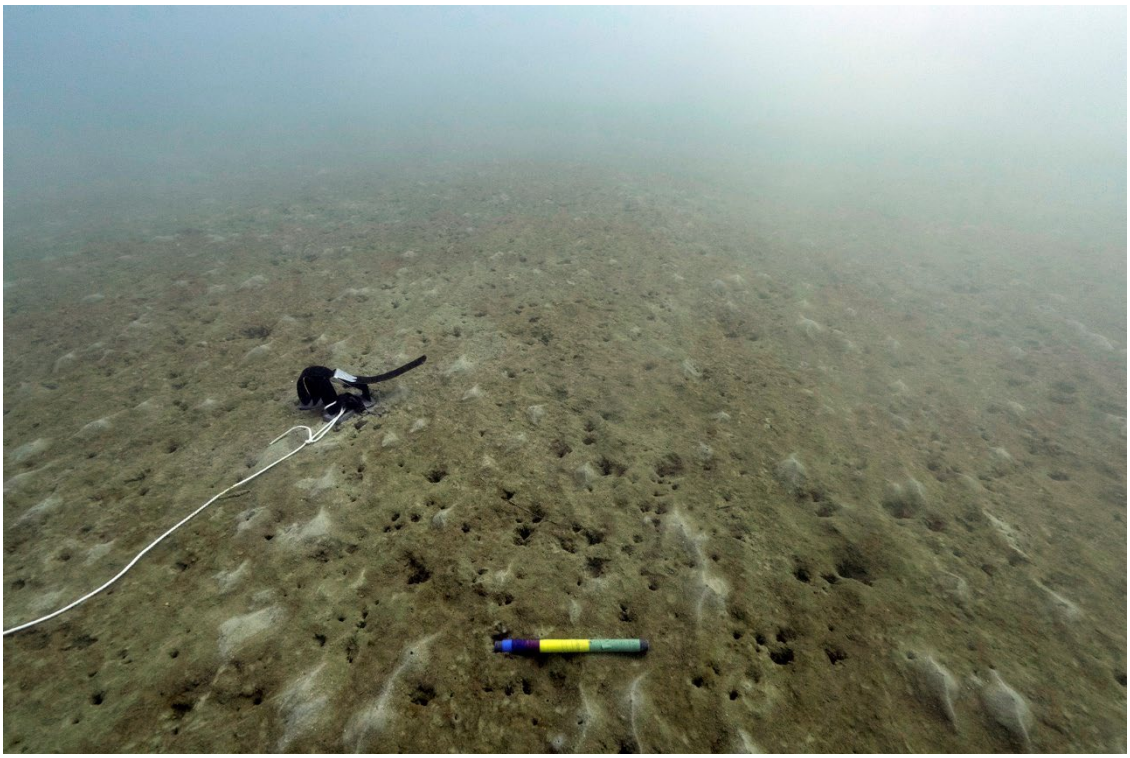


Figure 4 – Site Q14 Revised punchout point, silty sand sediment (depth ~ 18 m)



Figure 5 – Site Q16, silty sand sediment (depth ~ 18 m); located approximately 50 m offshore of the revised punchout point

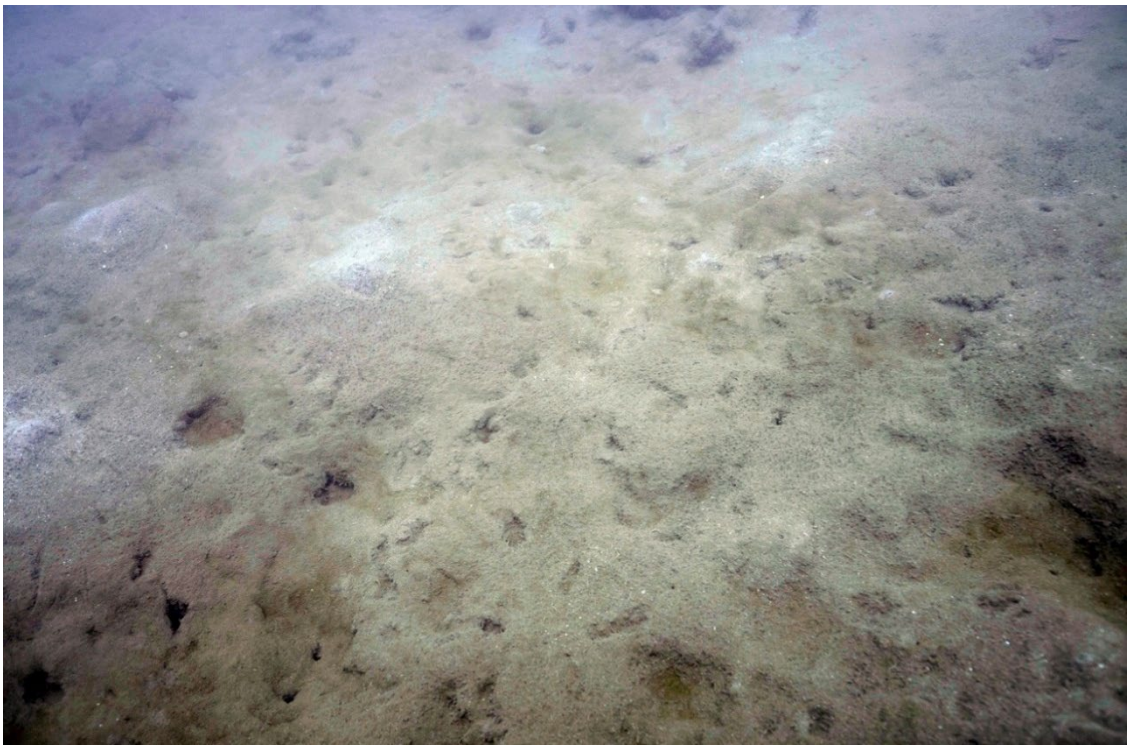


Figure 6 – P02, Sand and Fine Soft Sediment (Depth ~ 17 m); located approximately 15 m inshore of the revised punchout point

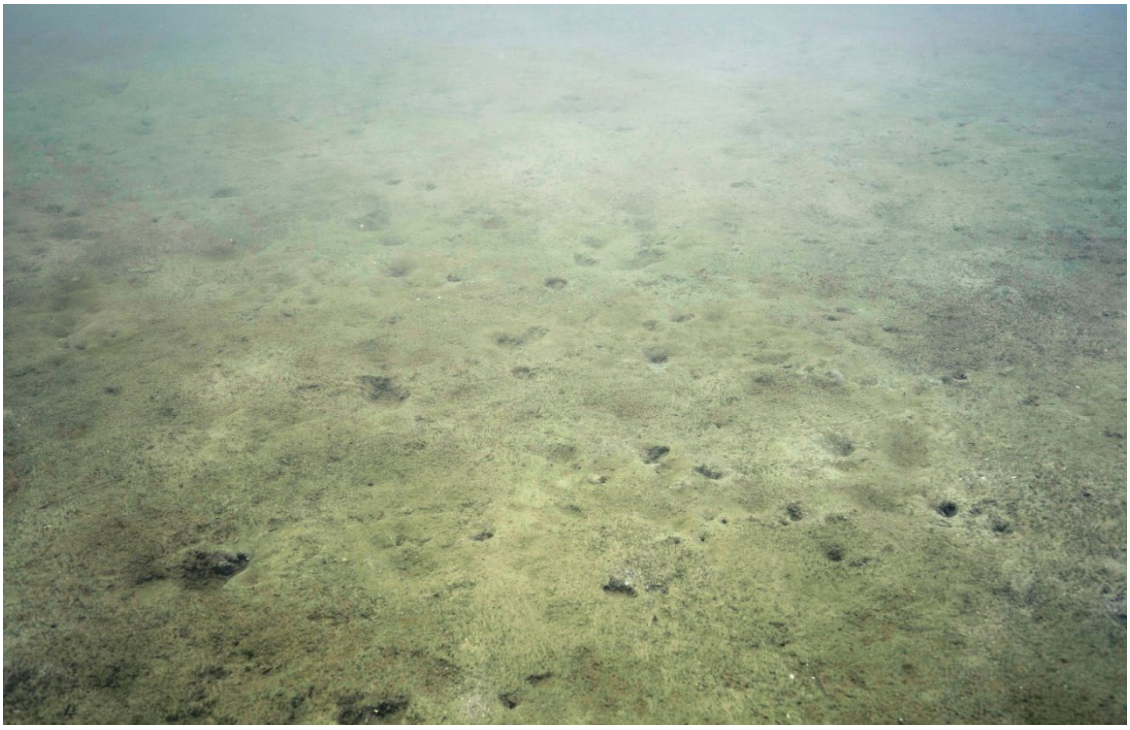


Figure 7– P03, Sand and Fine Soft Sediment (Depth ~ 17 m)

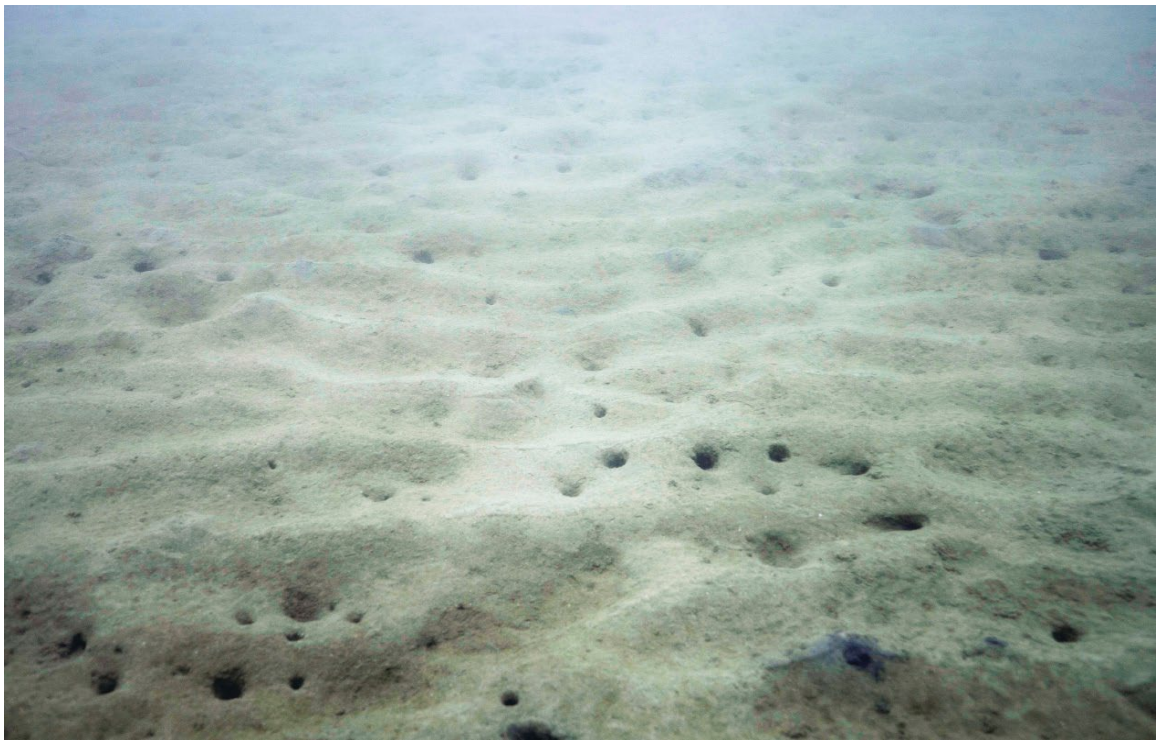


Figure 8 – P04, Sand and Fine Soft Sediment (Depth ~ 20 m)



Figure 9 – P05 (Depth ~ 20 m)

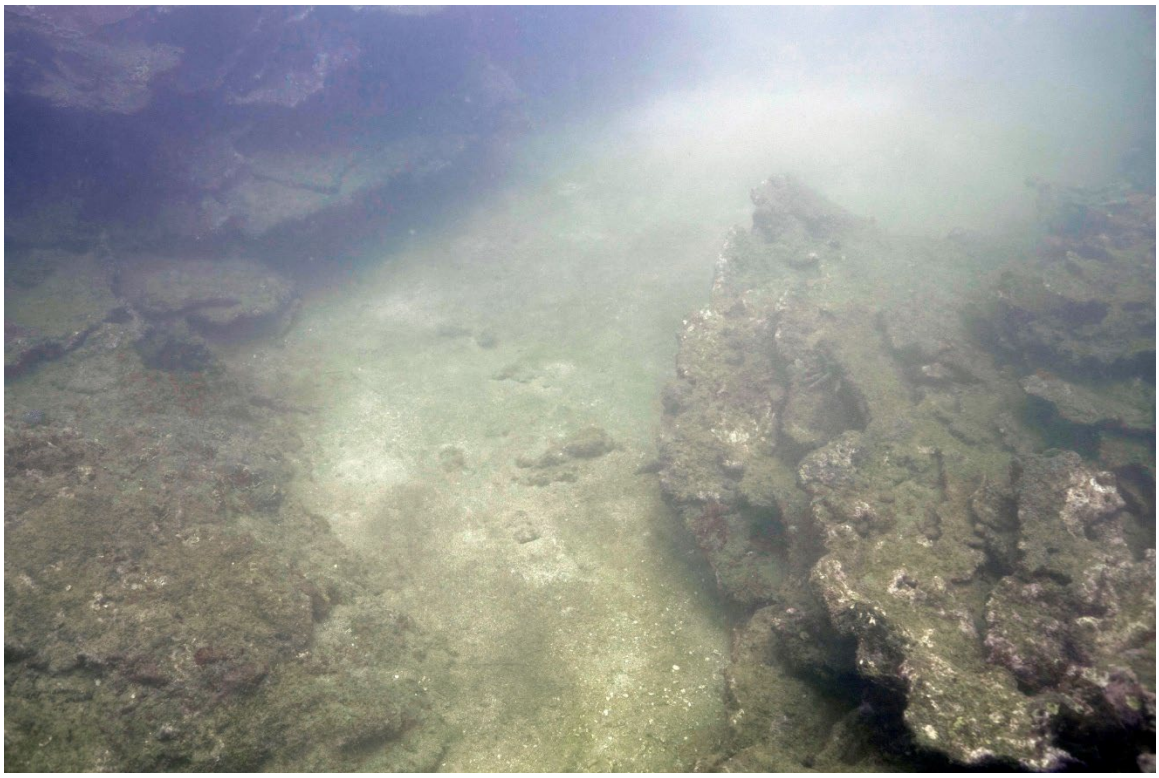


Figure 10 – P06 (Depth ~ 20 m)



Figure 11 – P07, Sand and Fine Soft Sediment (depth ~ 20 m)



Figure 12 – P08 (Depth ~ 19 m)



Figure 13 – P09 (Depth ~ 20 m)

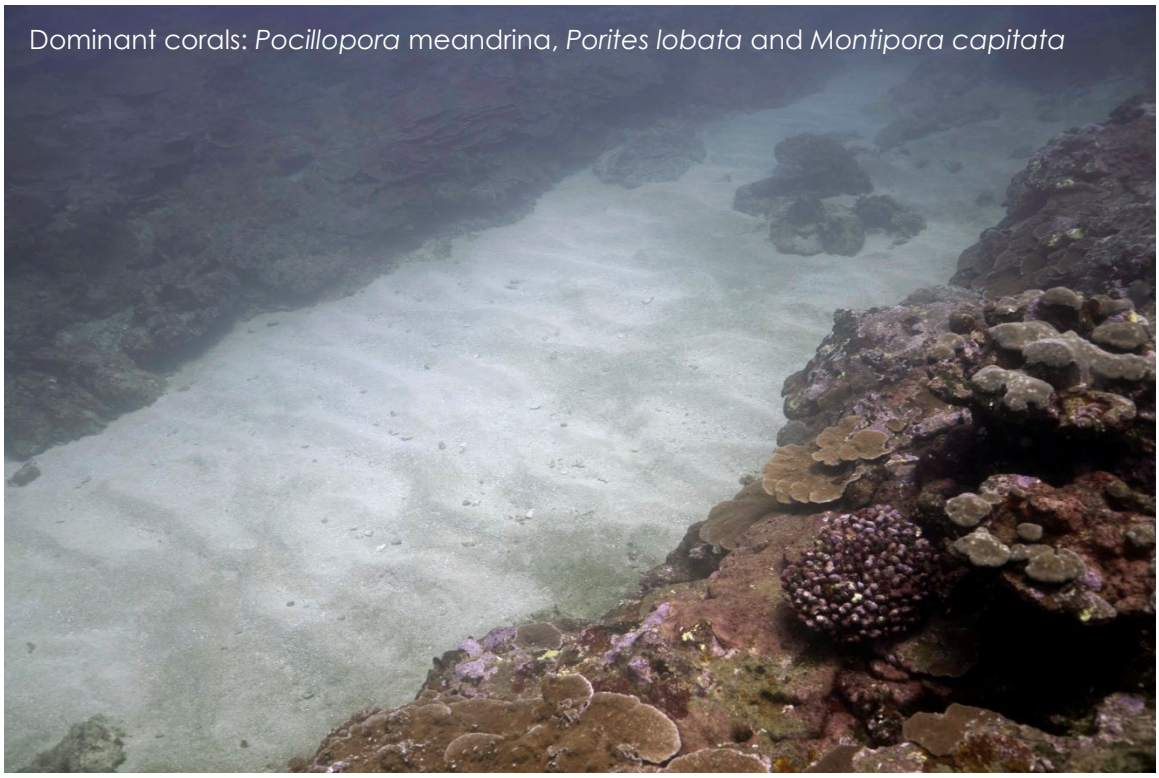


Figure 14 – P10 (Depth ~ 17 m)

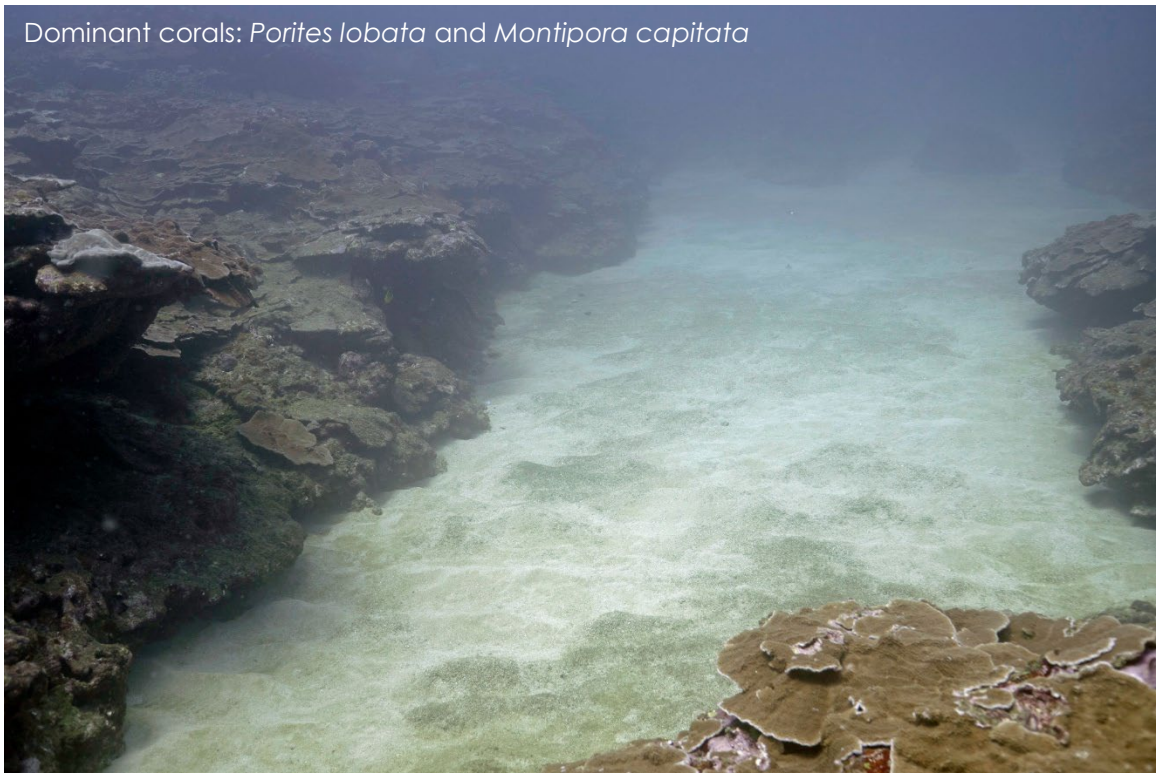


Figure 15 – P11 (Depth ~ 18 m)

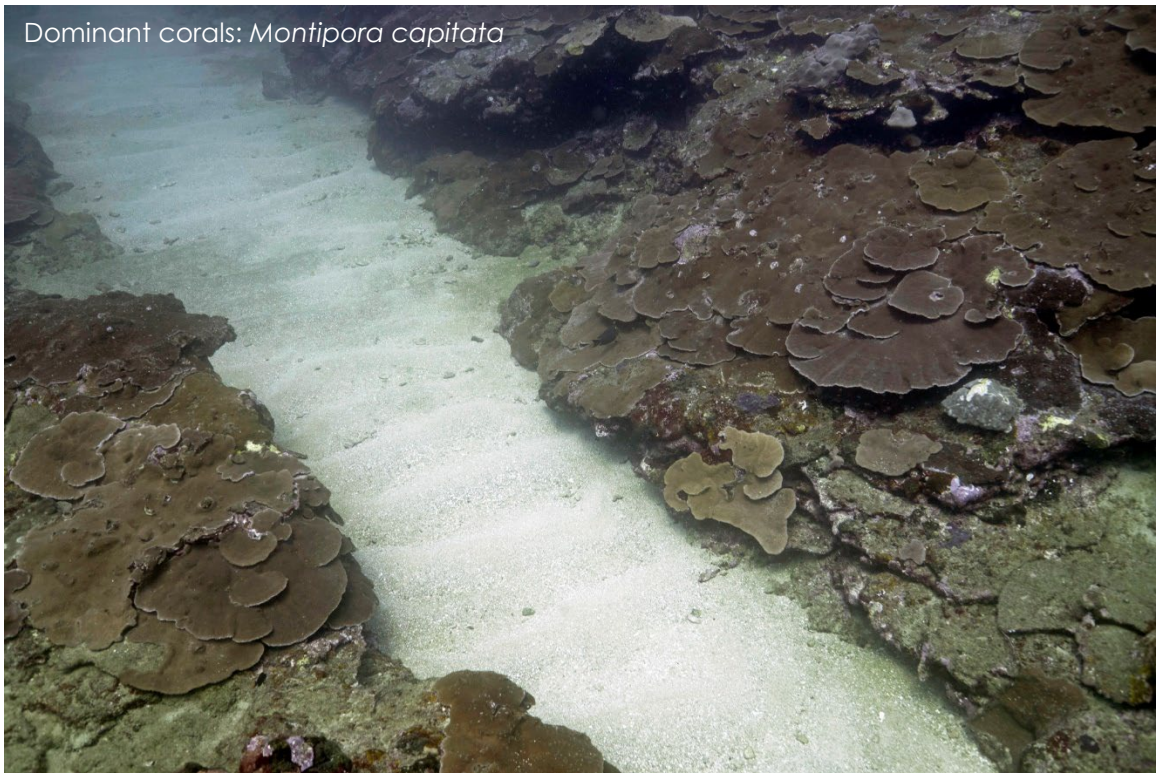


Figure 16 – P12 (Depth ~ 18 m)

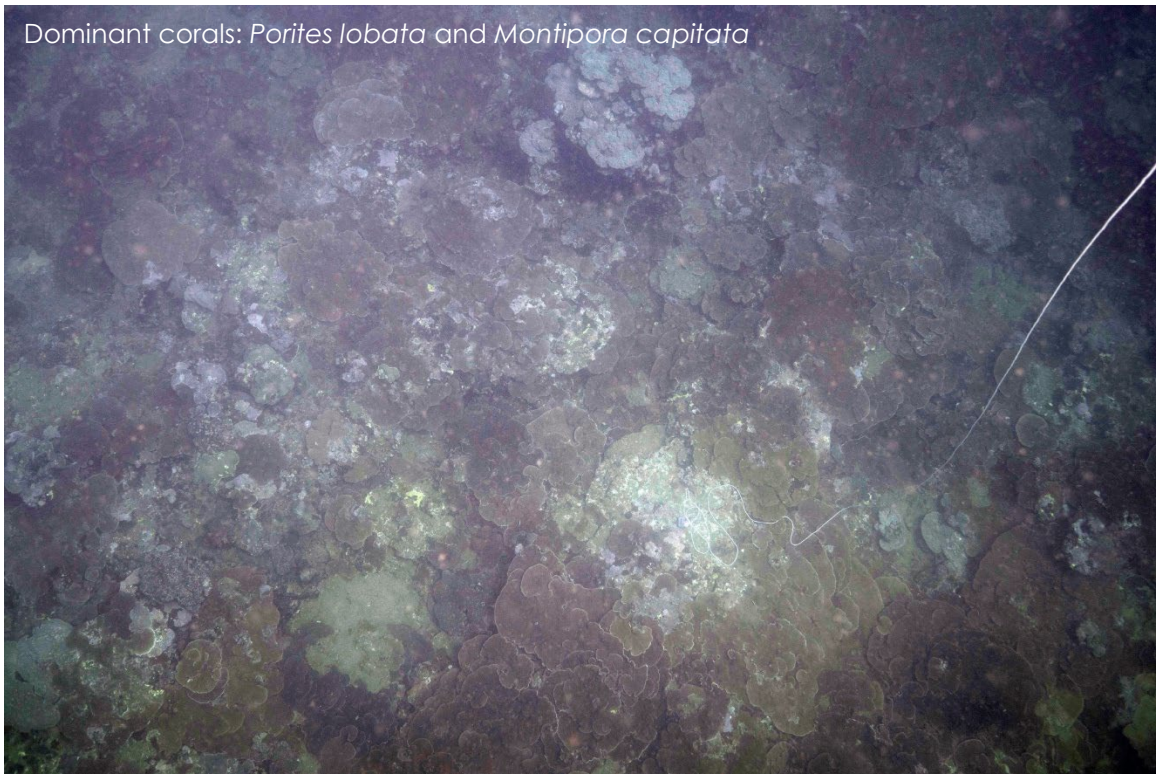


Figure 17 – P13 (Depth ~ 19 m)



Figure 18 – P14 (Depth ~ 21 m)



Figure 19 – P15 (Depth ~ 22 m)

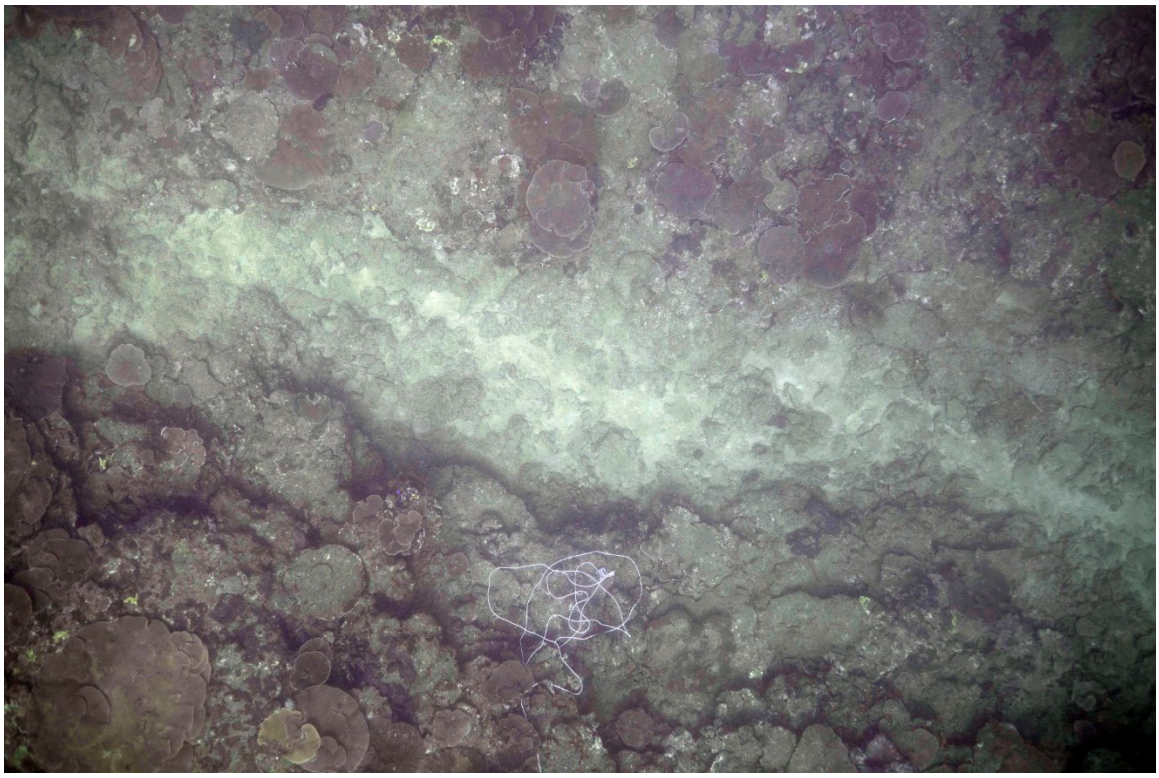


Figure 20 – P16 (Depth ~ 23 m)

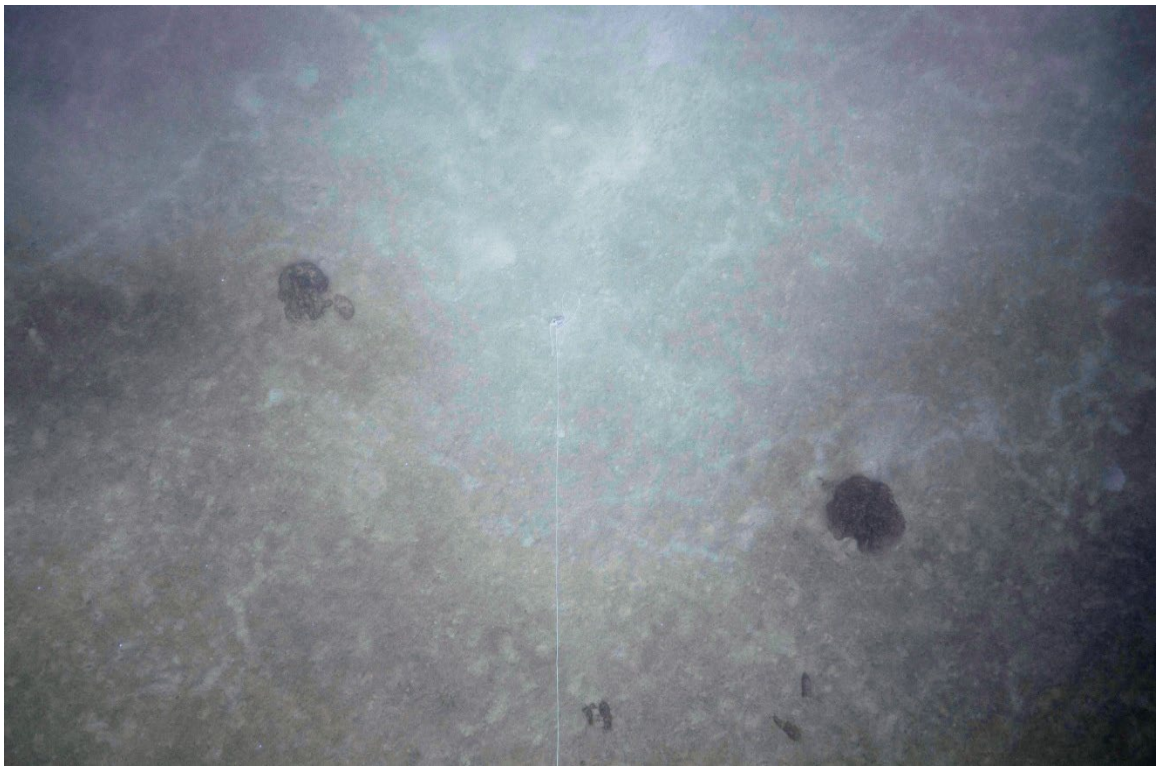


Figure 21 – P17 (Depth ~ 27 m)

Appendix A Quadrat Photographs from Quantitative Quadrat Surveys

Appendix B Coral Size-Class Frequency Data

SPECIES	SIZE CLASS (cm)	Q01	Q02	Q03	Q04	Q05	Q06	Q07	Q08	Q09	Q10	Q11	Q12	TOTAL
Leptastrea transversa	>0 – 5	-	-	-	-	-	-	-	-	-	1	-	-	**1**
	>10 – 20	-	-	-	-	-	-	-	-	-	1	-	-	**1**
	>20 – 40	-	-	-	-	-	-	-	-	-	1	-	-	**1**
	>40 - 80	-	-	-	-	-	-	-	1	-	1	-	-	**2**
TOTAL *L. transversa*		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**4**	**-**	**-**	**5**
Lobactis scutaria	>0 – 5	-	1	-	-	-	-	-	-	-	-	-	-	**1**
	>5 – 10	-	2	-	-	-	-	-	-	-	-	-	-	**2**
	>10 – 20	-	1	-	-	-	-	-	-	-	-	-	-	**1**
TOTAL *L. scutaria*		**-**	**4**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**4**
Montipora capitata	>0 – 5	-	1	-	-	-	1	1	1	2	1	-	-	**7**
	>5 – 10	-	1	-	-	-	-	2	-	1	1	3	-	**8**
	>10 – 20	-	-	-	-	-	2	1	4	1	3	2	4	**17**
	>20 – 40	-	-	-	-	-	-	3	9	2	2	2	1	**19**
	>40 - 80	-	1	-	-	-	1	5	2	-	1	-	2	**12**
	>80 - 160	-	-	-	-	-	1	-	1	-	1	-	2	**5**
	>160	-	-	-	-	-	-	-	-	1	-	-	-	**1**
TOTAL *M. capitata*		**-**	**3**	**-**	**-**	**-**	**5**	**12**	**17**	**7**	**9**	**7**	**9**	**69**
Montipora patula	>0 – 5	-	-	1	-	-	-	-	-	-	1	-	-	**2**
	>5 – 10	-	-	1	-	-	-	1	-	-	-	-	-	**2**
	>10 – 20	-	1	-	-	-	-	1	-	1	-	-	-	**3**
	>20 – 40	-	-	-	-	-	-	-	3	-	2	-	-	**5**
TOTAL *M.patula*		**-**	**1**	**2**	**-**	**-**	**-**	**2**	**3**	**1**	**3**	**-**	**-**	**12**
Pavona duerdeni	>10 – 20	-	-	-	-	-	-	-	-	-	-	1	-	**1**
TOTAL *P. duerdeni*		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1**
Pavona maldivensis	>0 – 5	-	3	-	-	-	-	-	-	-	-	-	-	**3**
	>5 – 10	-	1	-	-	-	2	-	-	-	-	-	-	**3**
TOTAL *P. maldivensis*		**-**	**4**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**6**
Pavona varians	>0 – 5	-	5	-	-	-	-	-	-	2	-	-	-	**7**
	>5 – 10	-	-	-	-	1	2	-	3	-	1	-	-	**7**
	>10 – 20	-	-	-	-	-	4	1	-	2	1	-	-	**8**
	>20 – 40	-	1	-	-	-	1	-	-	-	-	-	-	**2**
TOTAL *P. varians*		**-**	**6**	**-**	**-**	**1**	**7**	**1**	**3**	**4**	**2**	**-**	**-**	**24**
Pocillopora damicornis	>0 – 5	-	2	-	-	-	-	-	-	-	-	-	-	**2**
	>5 – 10	-	2	-	-	-	-	-	-	-	-	-	-	**2**
TOTAL *P. damicornis*		**-**	**4**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**4**
Pocillopora meandrina	>5 – 10	-	1	-	-	-	-	-	-	-	-	-	-	**1**
	>10 – 20	-	-	1	-	1	-	-	-	-	-	-	-	**2**
	>20 – 40	-	1	-	-	-	-	-	1	-	-	-	-	**2**
TOTAL *P. meandrina*		**-**	**2**	**1**	**-**	**1**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**5**
Porites compressa	>0 – 5	-	-	-	3	11	-	-	-	1	-	-	-	**15**
	>5 – 10	-	1	5	8	8	2	-	-	4	-	-	-	**28**
	>10 – 20	-	-	13	7	8	1	4	-	2	1	-	-	**36**
	>20 – 40	-	-	4	2	-	-	1	-	-	-	-	-	**7**
	>40 - 80	-	-	1	-	1	-	2	-	-	-	-	-	**4**
	>80 - 160	-	-	1	-	-	-	1	-	-	-	3	-	**5**
TOTAL *P. compressa*		**-**	**1**	**24**	**20**	**28**	**3**	**8**	**-**	**7**	**1**	**3**	**-**	**95**
Porites lobata	>0 – 5	-	12	-	-	1	-	-	-	-	-	-	-	**13**
	>5 – 10	-	-	-	-	1	-	-	-	-	-	1	-	**2**
	>10 – 20	-	-	-	1	2	-	2	-	2	1	1	-	**9**
	>20 – 40	-	-	-	-	2	1	1	3	1	1	1	1	**11**
	>40 - 80	-	-	-	-	1	-	-	-	-	1	-	-	**2**
	>80 - 160	-	-	-	1	-	-	-	-	-	-	-	-	**1**
TOTAL *P. lobata*		**-**	**12**	**-**	**2**	**7**	**1**	**3**	**3**	**3**	**3**	**3**	**1**	**38**
Porites rus	>0 – 5	-	24	3	3	2	-	-	-	-	-	-	-	**32**
	>5 – 10	-	21	7	2	4	2	-	-	-	-	-	-	**36**
	>10 – 20	-	11	13	4	4	1	-	-	-	-	-	-	**33**
	>20 – 40	-	1	5	5	-	-	-	-	-	-	-	-	**11**
	>40 - 80	-	2	1	3	-	4	-	-	-	-	-	-	**10**
	>80 - 160	-	-	-	-	-	3	-	-	-	-	-	-	**3**
TOTAL *P. rus*		**-**	**59**	**29**	**17**	**10**	**10**	**-**	**-**	**-**	**-**	**-**	**-**	**125**
ALL CORALS	**>0 – 5**	**-**	**48**	**4**	**6**	**14**	**1**	**1**	**1**	**5**	**3**	**-**	**-**	**83**
	>5 – 10	**-**	**29**	**13**	**10**	**14**	**8**	**3**	**3**	**5**	**2**	**4**	**-**	**91**
	>10 – 20	**-**	**13**	**27**	**12**	**15**	**8**	**9**	**4**	**8**	**7**	**4**	**4**	**111**
	>20 – 40	**-**	**3**	**9**	**7**	**2**	**2**	**5**	**16**	**3**	**6**	**3**	**2**	**58**
	>40 - 80	**-**	**3**	**2**	**3**	**2**	**5**	**7**	**3**	**-**	**3**	**-**	**2**	**30**
	>80 - 160	**-**	**-**	**1**	**1**	**-**	**4**	**1**	**1**	**-**	**1**	**3**	**2**	**14**
	>160	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**1**
ALL CORALS		**-**	**96**	**56**	**39**	**47**	**28**	**26**	**28**	**22**	**22**	**14**	**10**	**388**

NOTES: Sites Q13-Q16 were comprised entirely of sand with no reef substrate, therefore quadrat surveys were not conducted, and data for these sites is not included in this table.

APPENDIX G
BIOLOGICAL RESOURCES SURVEY REPORTS

Hawaiian Islands Fiber Link Project – Kauaʻi Cable Landing Site

Biological Resources Survey Report

Prepared for:
Ocean Networks, Inc. (ONI)

Revised August 2025

TETRA TECH

complex world | CLEAR SOLUTIONS™

Table of Contents

1.0 Introduction 1
1.1 Project Description 1
2.0 Description of the Study Area 2
2.1 Climate 2
2.2 Topography and Soils 3
2.3 Surface Waters 4
2.4 Critical Habitat for Listed Species 5
3.0 Methods 5
3.1 Plants 6
3.2 Wildlife 6
3.2.1 Birds 6
3.2.2 Terrestrial Mammals 6
3.2.3 Invertebrates 7
3.2.4 Sea Turtles and Marine Mammals 7
4.0 Results and Discussion 7
4.1 Plants 9
4.2 Wildlife 11
4.2.1 Birds 11
4.2.2 Terrestrial Mammals 14
4.2.3 Invertebrates 14
4.2.4 Sea Turtles and Marine Mammals 15
5.0 Conclusions and Recommendations 16
5.1 General 16
5.2 Plants 16
5.3 Wildlife 17
5.3.1 Listed Waterbirds 17
5.3.2 Nēnē 18
5.3.3 Listed Seabirds 18

5.3.4 Hawaiian Hoary Bat 19
5.3.5 Sea Turtles and Marine Mammals 19
6.0 References 20

List of Tables

Table 1. Monthly Rainfall at Nearby Līhu'e Airport Gage Prior to and During the Surveys 3
Table 2. NRCS Soil Units within the Study Area 4
Table 3. Federally or State-listed Species with the Potential to Occur in the Study Area 8
Table 4. Native Plant Species Recorded in the Study Area During the Surveys 9
Table 5. Bird Species Recorded in the Study Area and Immediate Vicinity 12
Table 6. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity 15

List of Figures

Figure 1. Project Overview
Figure 2. Project Study Area and Vicinity
Figure 3A. Project Study Area: Nukoli'i Beach
Figure 3B. Project Study Area: Kaua'i Community College
Figure 4A. Soils: Nukoli'i Beach
Figure 4B. Soils: Kaua'i Community College
Figure 5A. Water Resources Mapped by NWI, NHD, and DAR: Nukoli'i Beach
Figure 5B. Water Resources Mapped by NWI, NHD, and DAR: Kaua'i Community College
Figure 6. Critical Habitat Within the Study Area and Vicinity
Figure 7. Locations of Listed Plants in the Study Area
Figure 8. Observations of Listed Birds

List of Appendices

Appendix A. Representative Photographs of the Study Area

1.0 Introduction

The Hawaiian Islands Fiber Link (HIFL) Project is a proposed interisland submarine fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the State of Hawaiʻi. The Project would interconnect the six main Hawaiian Islands, with cable landing sites on Kauaʻi, Oʻahu, Maui, Lānaʻi, Molokai, and Hawaiʻi Island.

Tetra Tech was contracted to conduct a general biological survey within the 10.1-acre (4 hectare [ha]) terrestrial study area for the Kauaʻi cable landing site. The purpose of the survey was to characterize the species and habitats present, and to determine whether state or federally-listed threatened or endangered species (pursuant to the federal Endangered Species Act or Hawaiʻi Revised Statutes [HRS] Chapter 195D), or otherwise rare plants or animals have the potential to occur and could be impacted by construction or operation of the Project. This report summarizes the results of the biological surveys conducted within the Study Area by Tetra Tech on November 7, 2024 and April 29, 2025.

1.1 Project Description

The HIFL Project involves construction, operation, and maintenance of an interisland fiber optic cable system that would interconnect the six main Hawaiian Islands to provide more robust, diverse, and reliable broadband connectivity throughout the state. The fiber optic cable system would distribute high-speed broadband to each island, with cable landing sites strategically located on Kauaʻi (Nukoliʻi Beach), Oʻahu (Barbers Point), Maui (Kahului), Lānaʻi (Mānele Harbor), Molokai (Kaunakakai Harbor), and Hawaiʻi Island (Hilo). The overall extent of the Project is shown in Figure 1.

The system would include both marine and terrestrial components, with the marine component comprising approximately 416 miles (669 kilometers [km]) of fiber optic cable surface-laid on the seabed between the islands. The cable would have a maximum diameter of approximately 1.1 inch (28 millimeters [mm]) and would be installed in five distinct segments spanning the nearshore state waters and surrounding U.S. federal waters.

At the Kauaʻi cable landing site, a single borehole would be installed using horizontal directional drilling (HDD) to allow the subsea fiber optic cable(s) to traverse from the nearshore waters under the shoreline to the terrestrial Study Area. The terrestrial components that would be constructed within the Study Area include a beach manhole (BMH) and land-based cable (terrestrial cable). The BMH would be a below-ground reinforced concrete vault (or similar) which would serve as the connection chamber between the subsea cable and terrestrial cable. From the BMH, the terrestrial cable would be installed in new underground conduit located along Kauaʻi Beach Road and Kauaʻi Beach Drive, terminating at a manhole near the intersection with Kūhiō Highway. From this point, the Project would utilize fiber owned by a licensed utility as part of their existing utility network, generally following a route along

Kūhiō Highway and Kaumuali'i Highway to Kaua'i Community College (Figure 2).[1] Space within an existing building on the college campus would be used as the cable landing station (CLS).[2] The CLS would house cable operation and monitoring equipment and facilitate interconnection with the local telecommunications network. A new generator would be located adjacent to the existing building to provide emergency power for the CLS; trenching would be required for underground conduit to run power between the generator and the CLS.

2.0 Description of the Study Area

As shown in Figure 2, the Study Area is located on the southeastern portion of the island of Kaua'i. It encompasses 10.1 acres (4 ha) and is comprised of two non-contiguous areas: the cable landfall at Nukoli'i Beach Park just north of Hanamā'ulu and the CLS at the Kaua'i Community College (KCC) in Puhi. The Nukoli'i Beach portion of the Study Area includes the privately owned Nukoli'i Beach Park, portions of Kaua'i Beach Road and Kaua'i Beach Drive and associated rights-of-way (ROW), and a small portion of Kūhiō Highway and associated ROW near the intersection with Kaua'i Beach Drive (Figure 3A). It is located south of the Outrigger Kaua'i Beach Resort and is surrounded by agricultural and undeveloped lands. The Nukoli'i Beach portion of the Study Area includes portions of three tax map keys (TMK): (4) 3-7-003:007 (owned by Garden Isle Dream LLC), (4) 3-7-003:017 (owned by Kauai Beach Resort Assoc; Knickerbocker Life Ins Co; Walter T Shimoda; and Nancy Shimoda), and (4) 3-7-003:999 (state ROW).

The KCC portion of the Study Area is located in Puhi on the north side of Kaumuali'i Highway approximately 3 miles (4.8 km) west of Līhu'e Airport. It encompasses pedestrian walkways, landscaped areas, and various campus buildings including the Learning Resource Center and Natural Science building. The KCC portion of the Study Area is located within TMK (4) 3-4-007:003, which is owned by UH (Figure 3B).

2.1 Climate

The climate in the Nukoli'i Beach portion of the Study Area is characterized as moderately dry and the KCC portion is characterized as seasonally mesic (Price et al. 2012). The closest functioning National Weather Service (NWS) rainfall gage to the Study Area (Līhu'e Airport) is located 1.7 miles (2.8 km) south of Nukoli'i, and 3.1 miles (5 km) east of KCC. The gage receives a mean annual rainfall of 35 inches (890 mm) (NRCS NWCC 2025).

The monthly rainfall totals recorded at the gage prior to and during the surveys are shown in Table 1. The year-to-date total rainfall for this gage through the end of October 2024 was 90 percent of average (NWS 2025a), and drought conditions for the area in October 2024 were characterized as abnormally dry, which means the region was going into or coming out of drought (NWS 2024). The year-to-date

[1] The segment of terrestrial fiber on the existing utility system is described herein to provide an overview of the entire system but is not further addressed by this study because it comprises existing third-party infrastructure.

[2] Existing buildings were not included in the Study Area for biological surveys because the Project would not involve any new infrastructure or associated ground disturbance in the buildings.

total rainfall for this gage through the end of April 2025 was 55 percent of average (NWS 2025a), and drought conditions were reported as improved across Kaua‘i, identifying a cold front which brought heavy rain to the island in April (NWS 2025b). These data suggest dry conditions during the November 2024 survey and more normal conditions during the April 2025 survey.

Table 1. Monthly Rainfall at Nearby Līhu‘e Airport Gage Prior to and During the Surveys

Date	Rainfall Total; Percentage of Average
September 2024	0.64 inches; 29%
October 2024	0.97 inches; 30%
November 2024	2.06 inches; 51%
December 2024	1.25 inches; 27%
January 2025	2.49 inches; 90%
February 2025	0.71 inches; 20%
March 2025	0.58 inches; 10%
April 2025	3.98 inches; 196%

Sources: NWS 2025a; NRCS NWCC 2025.
Note: Months when surveys occurred are highlighted in light grey.

2.2 Topography and Soils

The Nukoli‘i Beach portion of the Study Area gently slopes from mauka to makai, with elevations ranging from approximately 64 feet (19 meters [m]) above mean sea level on the near the intersection of Kaua‘i Beach Drive and Kuhio Highway to sea level along the shoreline at Nukoli‘i Beach Park. The KCC portion of the Study Area is nearly flat around 340 feet (104 m) above mean sea level.

The Natural Resources Conservation Service (NRCS) identifies seven soil types in the Nukoli‘i Beach portion of the Study Area (NRCS 2024). These soil types are shown in Figure 4A and described in Table 2. Soils within the KCC portion of the Study Area are comprised entirely of Puhi silty clay loam, 3 to 8 percent slopes (Table 2, Figure 4B; NRCS 2024).

Table 2. NRCS Soil Units within the Study Area

NRCS Soil Unit	Description
Nukoliʻi Beach	
Beaches	Comprised of coarse sand characterized as excessively drained with very low runoff.
Fill land	Comprised of silty clay loam, sand, and bedrock, and characterized as well draining with low runoff.
Lihue gravelly silty clay, 0 to 8 percent slopes	Comprised of basic igneous dust characterized as well drained with low runoff.
Lihue gravelly silty clay, 8 to 15 percent slopes	Comprised of basic igneous dust characterized as well drained with medium runoff.
Lihue gravelly silty clay, 25 to 40 percent slopes, eroded	Comprised of basic igneous dust characterized as well drained with high runoff.
Mokulēʻia fine sandy loam	Alluvium deposits characterized as well drained with very low runoff.
Mokulēʻia clay loam, poorly drained variant	Alluvium deposits characterized as poorly drained with negligible runoff.
Kauaʻi Community College	
Puhi silty clay loam, 3 to 8 percent slopes	Comprised of basic igneous rock characterized as well drained with medium runoff.

2.3 Surface Waters

The Nukoliʻi Beach and KCC portions of the Study Area are situated within the Kawailoa and Puali watersheds, which encompass roughly 4 square miles (10.4 square kilometers) and 2 square miles (5.2 square kilometers), respectively (CWRM 2019, CWRM 2022). Water features identified in the vicinity of the Study Area by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data (USFWS 2024), the U.S. Geological Survey (USGS) topographic and National Hydrography Dataset (NHD; USGS 2023), and the State of Hawaiʻi Division of Aquatic Resources (DAR) dataset (DAR 2008) for the Nukoliʻi Beach and KCC portions of the Study Area are shown in Figure 5A and 5B, respectively.

NWI and NHD identify two linear water features crossing through the Nukoliʻi Beach portion of the Study Area at Kauaʻi Beach Drive (Figure 5A). NWI maps a riverine feature (Riverine, Intermittent, Streambed, Seasonally Flooded, Nontidal, Excavated) crossing twice through Kauaʻi Beach Drive (USFWS 2024). NHD identifies these linear features as Canal/Ditches (USGS 2023). Both datasets show the more eastern water feature continuing south and paralleling the west side of Kauaʻi Beach Road. NWI shows the riverine feature splitting at the curve in Kauaʻi Beach Road, and continuing east along the south side of Kauaʻi Beach Road and entering the Pacific Ocean at Nukoliʻi Beach (Figure 5A). NHD identifies the linear feature along the south side of Kauaʻi Beach Road as a perennial stream (USGS 2023). DAR does not map any water features within the Study Area, but identifies perennial Kawailoa Stream to the south of Kauaʻi Beach Road (DAR 2008) in the same location as the NHD stream (Figure 5A). NWI also identifies

an estuarine and marine wetland along the shoreline within the Study Area. NWI and NHD also map several water features in the immediate vicinity of the Study Area, including a large freshwater emergent wetland immediately to the west of Kaua'i Beach Road, wetlands and ponds to the south of Kaua'i Beach Road, and the Pacific Ocean to the east of the Study Area (Figure 5A).

No water features are identified within the KCC portion of the Study Area. The closest identified surface water is a lake/pond mapped 228 feet (70 m) to the east by NHD (Figure 5B). The datasets also map the perennial Puali Stream roughly 550 feet (160 m) to the west (Figure 5B; DAR 2008, USGS 2023, USFWS 2024). Additional surface waters are mapped to the north, northwest, and southeast of the Study Area (Figure 5B).

2.4 Critical Habitat for Listed Species

USFWS and the National Oceanic and Atmospheric Administration (NOAA) have proposed critical habitat for the Central North Pacific distinct population segment of the threatened green sea turtle/ honu (*Chelonia mydas*) within the Study Area and immediate vicinity. Terrestrial critical habitat for the green sea turtle occurs along the coastline within the Study Area (USFWS 2023a; Figure 6). Proposed marine critical habitat for the green sea turtle occurs immediately to the east of the Study Area (Figure 6); proposed marine critical habitat includes all waters surrounding the island from the mean high water line to 65-foot (20 m) water depth (NOAA 2023a, NOAA 2023b).

Designated marine critical habitat for the endangered Hawaiian monk seal/ 'īlio-holo-i-ka-uaua (*Neomonachus schauinslandi*) occurs immediately to the east of the Study Area (Figure 6). Monk seal marine critical habitat encompasses marine habitat surrounding the island out to the 656-foot (200 m) depth contour line (NOAA 2015). No terrestrial critical habitat for the Hawaiian monk seal occurs within the Study Area or immediate vicinity (NOAA 2015).

No critical habitat for threatened or endangered plants or terrestrial wildlife has been designated within the Study Area or vicinity (USFWS 2024b).

3.0 Methods

Prior to the field surveys, Tetra Tech conducted a review of relevant publicly available literature and data with respect to biological resources in and near the Study Area. This review included environmental assessments and environmental impact statements, NWI and NHD data, scientific journals and reports, the USFWS Information for Planning and Consultation (IPaC) tool, and available unpublished data that are relevant to the natural history and ecology of the area. In addition, Tetra Tech reviewed available geospatial data, aerial photographs, and topographic maps of the area to identify occurrences of state or federally-listed species, or habitats that could harbor these species. The biological field surveys were conducted by Tetra Tech on November 7, 2024 and April 29, 2025. Details regarding the field survey methodologies are provided below.

3.1 Plants

A pedestrian survey was conducted to identify and record common plant species and dominant vegetation types, as well as rare or listed plant species within the Study Area. Areas more likely to support native plants (e.g., rocky outcrops and shady areas) were more intensively examined. Plant identifications were made in the field; plants that could not be positively identified were photo-documented for comparison with the recent taxonomic literature.

Plants recorded during these surveys are indicative of the season and environmental conditions at the time of the surveys. The presence and location of plants can be influenced by seasonal and temporal changes; therefore, it is possible additional species may occur within the Study Area but were not present during these surveys.

The taxonomy and nomenclature of plants are in accordance with Wagner et al. (2023) and Staples and Herbst (2005). Common/ Hawaiian names are provided first, followed by scientific names in parentheses. If no common or Hawaiian name is known, only the scientific name is provided.

3.2 Wildlife

Wildlife surveys consisted of observations and identification of birds, terrestrial and marine mammals, and conspicuous invertebrate species encountered while searching the Study Area. Tetra Tech recorded all wildlife seen or heard while walking and driving within the Study Area coupled with visual observation of scat, tracks, and other animal sign. Habitats or plants that could support listed wildlife species were also identified if present (such as host plants for listed invertebrates or water features as potential habitat for listed Hawaiian waterbirds). Specific survey methods of each wildlife group are provided below.

3.2.1 Birds

All birds seen or heard while walking within the Study Area and vicinity were recorded. Habitats or plants that could support listed birds were also identified if present (e.g., water features as potential habitat for listed Hawaiian waterbirds). Scientific nomenclature for birds follows Birds of the World (Billerman et al. 2022).

3.2.2 Terrestrial Mammals

The terrestrial mammal surveys were limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign while walking within the Study Area. Scientific names for mammals follow Tomich (1986).

Ultrasonic bat detectors for the endangered Hawaiian hoary bat/ ʻōpeʻapeʻa (*Lasiurus semotus*) were not deployed as part of the surveys. Rather, as USFWS and State of Hawaiʻi Division of Forestry and Wildlife (DOFAW) recognize all woody vegetation greater than 15 feet (4.6 m) tall as potential bat roosting habitat (DOFAW 2015, USFWS 2023b), the presence/absence of suitable bat foraging and roosting habitat within the Study Area was noted.

3.2.3 Invertebrates

Observations of large and conspicuous insects and invertebrates were recorded incidentally to wildlife surveys while walking through the Study Area. Invertebrates were identified through visual observations and were not collected as specimens in the field. Scientific nomenclature for terrestrial invertebrates follows Nishida (2002) and follows WoRMS Editorial Board (2024) for marine invertebrates.

3.2.4 Sea Turtles and Marine Mammals

These surveys focused on characterizing the nearshore marine and shoreline habitat for listed sea turtles and protected marine mammals (e.g., monk seals) and was limited to visual observations from the shoreline using binoculars. Biologists scanned the nearshore marine waters and suitable nearshore terrestrial habitat for individuals or their potential habitat.

4.0 Results and Discussion

The biological resources in the Study Area have been highly modified by historic land uses and the introduction of invasive species, which has greatly reduced the number and abundance of native species and habitats suitable for native species. Paved roads, a parking area, and infrastructure associated with the beach park are present within the Nukoliʻi Beach portion of the Study Area. The KCC portion of the Study Area contains infrastructure and outdoor spaces associated with the college campus, as well as buildings and maintained landscaping. Representative photographs from the surveys are presented in Appendix A.

Two federally and state-listed bird species—the Hawaiian duck/ koloa (*Anas wyvilliana*) and the Hawaiian common gallinule/ ʻalae ʻula (*Gallinula galeata sandvicensis*)—were observed within the Nukoliʻi Beach portion of the Study Area during the surveys. Two additional state and federally-listed bird species—the Hawaiian stilt/ aeʻo (*Himantopus mexicanus knudseni*) and Hawaiian goose/ nēnē (*Branta sandvicensis*)—were observed using habitat immediately adjacent to the Nukoliʻi Beach portion of the Study Area. Although no wild individuals of state or federally listed plants occur within the Study Area, one endangered plant species is planted within the KCC portion of the Study Area. Several additional listed animal species, including listed seabirds and the Hawaiian hoary bat, may occassionally occur in or traverse the Study Area. Listed species with the potential to occur in the Study Area are summarized in Table 3 and are discussed in further detail below.

Table 3. Federally or State-listed Species with the Potential to Occur in the Study Area

Common/Hawaiian Name(s)	Scientific Name	Listing Status[1]	Critical Habitat in Study Area	Potential Occurrence in Study Area
Birds				
Hawaiian common gallinule/ ʻalae ʻula	*Gallinula galeata sandvicensis*	SE, FE	None Designated	Likely to forage/loaf within and adjacent to the Study Area and could nest in the vicinity.
Hawaiian coot/ ʻalae keʻo keʻo	*Fulica alai*	SE, FE	None Designated	Could forage/loaf within and adjacent to the Study Area and could nest in the vicinity.
Hawaiian duck/ koloa	*Anas wyvilliana*	SE, FE	None Designated	Could forage/loaf within and adjacent to the Study Area and could nest in the vicinity.
Hawaiian stilt/ aeʻo	*Himantopus mexicanus knudseni*	SE, FE	None Designated	Could use grassy fields within and immediately adjacent to the Study, or fly over, but no suitable nesting habitat present.
Hawaiian goose/ nēnē	*Branta sandvicensis*	SE, FT	None Designated	Likely to forage/loaf within and adjacent to the Study Area, or fly over, but no suitable nesting habitat present.
Hawaiian petrel/ ʻuaʻu	*Pterodroma sandwichensis*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Newell's shearwater/ ʻaʻo	*Puffinus auricularis newelli*	ST, FT	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Band-rumped storm-petrel/ ʻakēʻakē	*Hydrobates castro*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Terrestrial Mammals				
Hawaiian hoary bat/ ʻōpeʻapeʻa	*Lasiurus semotus*	SE, FE	None Designated	Could traverse or forage in the Study Area or roost in vegetation > 15 feet in height.
Sea Turtles and Marine Mammals				
Green sea turtle/ honu	*Chelonia mydas*	ST, FT	Proposed terrestrial within Study Area	Could nest and bask at Nukoliʻi Beach and forage offshore.
Hawaiian monk seal/ ʻīlio-holo-i-kauaua	*Neomonachus schauinslandi*	SE, FE	Marine in immediate vicinity	Could haul out on the sandy shoreline at Nukoliʻi Beach or forage offshore.

1. FE = Federally endangered; SE = State endangered; FT = Federally threatened; ST = State threatened.

4.1 Plants

No wild individuals of federal or state listed threatened, endangered, proposed listed, or candidate plant species were observed in the Study Area during the biological surveys. However, one endangered plant species—loulu (*Pritchardia napaliensis*)—is planted within the KCC portion of the Study Area. In total, thirteen native plant species were recorded in the Study Area during the surveys (Table 4). All of these species are indigenous to the Hawaiian Islands (Wagner et al. 2023), except the endemic species koki'o ke'o ke'o (*Hibiscus waimeae* subsp. *waimeae*) and the endangered loulu, both of which only occur as planted individuals at KCC.

Table 4. Native Plant Species Recorded in the Study Area During the Surveys

Common/ Hawaiian Name	Scientific Name	Status	Nukoli'i Beach	KCC
'ae'ae	*Bacopa monnieri*	I	✓	
'aki'aki	*Sporobolus virginicus*	I	✓	
'ākulikuli	*Sesuvium portulacastrum*	I	✓	
alena	*Boerhavia repens*	I	✓	
hau	*Hibiscus tiliaceus*	I	✓	
kīpukai	*Heliotropium curassavicum*	I	✓	
koki'o ke'o ke'o	*Hibiscus waimeae* subsp. *waimeae*^	E		✓
kou	*Cordia subcordata*^	I		✓
loulu	*Pritchardia napaliensis*[1]^	E		✓
milo	*Thespesia populnea*^	I	✓	✓
naupaka kahakai	*Scaevola taccada* subsp. *taccada*	I	✓	✓
pōhinahina	*Vitex rotundifolia*^	I		✓
pōhuehue	*Ipomoea pes-caprae* subsp. *brasiliensis*	I	✓	

Status: E = Endemic (native only to the Hawaiian Islands); I = Indigenous (native to the Hawaiian Islands and elsewhere).

1. Federally and state listed as endangered.

^= Only planted; not naturally-occurring.

Nukoli'i Beach Portion of the Study Area

Vegetation in the Nukoli'i Beach portion of the Study Area is characterized by three vegetation types: Maintained Beach Park Vegetation, Coastal Strand, and Landscaped Areas.

Maintained Beach Park Vegetation: This vegetation type occurs in the eastern portion of the Study Area surrounding the park facilities. It is primarily comprised of maintained grassy areas dominated by St. Augustine grass (*Stenotaphrum secundatum*) and Bermuda grass (*Cynodon dactylon*) mixed with non-native naturalized and planted ornamental species (Appendix A, Photos 1 – 2). Weedy species growing

within the grassy areas include beach wiregrass (*Dactyloctenium aegyptium*), nut grass (*Cyperus rotundus*), wedelia (*Sphagneticola trilobata*), creeping indigo (*Indigofera spicata*), red 'ilima (*Sida ciliaris*), khaki weed (*Alternanthera pungens*), alyce clover (*Alysicarpus vaginalis*), wide-leaved carpet grass (*Axonopus compressus*), and McCoy grass (*Cyperus gracilis*). The native naupaka kahakai (*Scaevola taccada* subsp. *taccada*), Polynesian-introduced coconut palms (*Cocos nucifera*), and the non-native spider lily (*Crinum asiaticum*) are planted near the park restrooms. A large clump of Christmas berry (*Schinus terebinthifolia*) and milo (*Thespesia populnea*) also occurs in the northeastern portion of this vegetation type. Scattered individuals of the native 'ākulikuli (*Sesuvium portulacastrum*), alena (*Boerhavia repens*), kīpukai (*Heliotropium curassavicum*), and pōhuehue (*Ipomoea pes-caprae* subsp. *brasiliensis*) are present but rare in occurrence in the beach park area, and a patch of the native 'ae'ae (*Bacopa monnieri*) occurs near the showers.

Coastal Strand: This vegetation type occurs as a relatively narrow band between the maintained park vegetation and the shoreline. The coastal strand vegetation is dominated by patches of the native naupaka kahakai surrounded by the native 'aki'aki (*Sporobolus virginicus*) grass, as well as scattered non-native tree heliotrope (*Heliotropium arboreum*) (Appendix A, Photo 3). Other species in this vegetation type include maunaloa (*Canavalia cathartica*), beach wiregrass (*Dactyloctenium aegyptium*), alena, and sourbush (*Pluchea carolinensis*).

Landscaped Areas: The vegetation along the Kaua'i Beach Road, Kaua'i Beach Drive, and Kūhio Highway ROWs is comprised of landscaped areas. This vegetation type consists of maintained grass or ground cover and planted trees and shrubs (Appendix A, Photos 4 – 8). The maintained grassy areas in the ROWs are predominately comprised of Bermuda grass, St. Augustine grass, or wide-leaved carpet grass. A maintained hedge of koa haole (*Leucaena leucocephala* subsp. l*eucocephala*) is present along the east side of Kaua'i Beach Road (Appendix A, Photo 6), and wedelia is planted along the west side of Kaua'i Beach Road on the slope adjacent to the ditch. Plantings of *Pseuderanthemum carruthersii*, *Dracaena reflexa*, and oleander (*Nerium oleander*) are present near the intersection of Kūhio Highway and Kaua'i Beach Drive. Coconut palms, areca palms (*Dypsis lutescens*), and Chinese hibiscus (*Hibiscus rosa-sinensis*) are planted along the ROW near the intersection of Kaua'i Beach Drive and Kaua'i Beach Road. Large ficus trees (*Ficus* sp.) reaching up to 50 feet (15 m) tall and wedelia are planted along Kaua'i Beach Drive (Appendix A, Photo 7). Weedy species growing within and along the edges of landscaped areas within the Study Area include Chinese violet (*Asystasia gangetica*), pitted beardgrass (*Bothriochloa pertusa*), Carolina love grass (*Eragrostis pectinacea*), swollen fingergrass (*Chloris barbata*), nut sedge (*Cyperus rotundus*), coral berry (*Rivina humilis*), coat buttons (*Tridax procumbens*), creeping indigo, *Calyptocarpus vialis*, false mallow (*Malvastrum coromandelianum* subps. *coromandelianum*), wire grass (*Eleusine indica*), niruri (*Phyllanthus debilis*), pualele (*Emilia fosbergii*), sensitive plant (*Mimosa pudica*), false ragweed (*Parthenium hysterophorus*), red 'ilima, alyce clover, and buttonweed (*Spermacoce remota*). Tall canopy of trees immediately adjacent to the Study Area overhang portions the ROWs and include ironwood (*Casuarina equisetifolia*), monkeypod (*Samanea saman*), hau (*Hibiscus tiliaceus*), and false kamani (*Terminalia catappa*) (Appendix A, Photo 5 – 7).

KCC Portion of the Study Area

Vegetation in the KCC portion of the Study Area is comprised of Landscaped Areas.

Landscaped Areas: Landscaped Areas within the KCC portion of the Study Area consists of open, maintained lawns with native and ornamental species planted around building edges and walkways (Appendix A, Photos 9 – 13). The lawn is comprised of several grasses including St. Augustine grass, Bermuda grass, Hilo grass (*Paspalum conjugatum*), pitted beardgrass, wide-leaved carpet grass, and wire grass, with various low-growing weedy plant species interspersed throughout. Weedy species occur along the edges of walkways and buildings, including love grass (*Eragrostis tenella*), nut sedge, white kyllinga (*Cyperus mindorensis*), hairy spurge (*Euphorbia hirta*), *Calyptocarpus vialis*, *Centella asiatica*, *Erigeron bonariensis*, *Galinsoga parviflora*, narrow-leaved plantain (*Plantago lanceolata*), oriental hawksbeard (*Youngia japonica*), artillery plant (*Pilea microphylla*), black medick (*Medicago lupulina*), coat buttons, creeping indigo, and sensitive plant. Several native species are planted within the Study Area, including naupaka kahakai, milo, pōhinahina (*Vitex rotundifolia*), koki'o ke'o ke'o (*Hibsicus waimeae* subsp. *waimeae*), and kou (*Cordia subcordata*). In addition, three endemic and endangered loulu palms (*Pritchardia napaliensis*) are planted northwest of the Learning Resource Center (Appendix A, Photo 10; Figure 7). Other listed species, including the endangered *Polyscias lallanii* and endangered *Hibiscus clayi*, have been planted in the vicinity, but are outside of the Study Area. Non-native planted trees and palms in the Study Area include MacArthur palm (*Ptychosperma macarthurii*), formosa koa (*Acacia confusa*), fern tree (*Felicium decipiens*), and the Polynesian-introduced kukui (*Aleurites moluccanus*). Other planted non-native ornamental species include the maile-scented fern (*Microsorum grossum*), Sago palm (*Cycas revoluta*), Yeddo hawthorn (*Raphiolepis umbellata*), Chinese hibiscus (*Hibiscus rosa-sinensis*), Chinese ixora (*Ixora chinensis*), money tree (*Dracaena marginata*), tiare (*Gardenia taitensis*), snowbush (*Breynia disticha*), tī (*Cordyline fruticosa*), bougainvillea (*Bougainvillea spectabilis*), laua'e haole (*Phlebodium aureum*), and red ginger (*Alpinia purpurata*).

4.2 Wildlife

4.2.1 Birds

Twenty bird species were recorded in the Study Area and immediate vicinity during the surveys (Table 5). This includes the endangered Hawaiian duck flying over the Nukoli'i Beach portion of the Study Area and the endangered Hawaiian common gallinule along Kaua'i Beach Road. The listed Hawaiian stilt and Hawaiian goose were also observed immediately adjacent to the Study Area (see details below). Two additional native species—Pacific golden-plover/ kōlea (*Pluvialis fulva*) and ruddy turnstone/ 'akekeke (*Arenaria interpres*)—were observed within the Study Area; these species are also protected by the Migratory Bird Treaty Act (MBTA). The remaining bird species recorded are non-native to the Hawaiian Islands. The most common bird species recorded during the surveys were the common myna (*Acridotheres tristis*), Pacific golden plover, and chestnut munia (*Lonchura atricapilla*). Documented listed bird species, or listed birds that have the potential to occasionally occur in or traverse the Study Area, are discussed below.

Table 5. Bird Species Recorded in the Study Area and Immediate Vicinity

Common/ Hawaiian Name	Scientific Name	Status	Nukoli'i Beach	KCC
Cattle egret	*Bubulcus ibis* [1]	NN	✓	✓
Chestnut munia	*Lonchura atricapilla*	NN	✓	✓
Common myna	*Acridotheres tristis*	NN	✓	✓
Hawaiian common gallinule/ 'alae 'ula	*Gallinula galeata sandvicensis*[2]	E	✓	
Hawaiian duck/ koloa maoli	*Anas wyvilliana*[2]	E	✓	
Hawaiian goose/ nēnē	*Branta sandvicensis* [3]	E	✓	
Hawaiian stilt/ ae'o	*Himantopus mexicanus knudseni* [2]	E	✓	
House finch	*Haemorhous mexicanus* [1]	NN	✓	
Java sparrow	*Padda oryzivora*	NN	✓	
Mourning dove	*Zenaida macroura*[1]	NN	✓	
Pacific golden-plover/ kōlea	*Pluvialis fulva*[1]	M	✓	
Red junglefowl	*Gallus gallus*	NN	✓	✓
Red-crested cardinal	*Paroaria coronata*	NN	✓	
Rock pigeon	*Columba livia*	NN	✓	✓
Ruddy turnstone/ 'akekeke	*Arenaria interpres* [1]	M	✓	
Scaly-breasted munia	*Lonchura punctulata*	NN	✓	
Spotted dove	*Spilopelia chinensis*	NN	✓	
Warbling white-eye	*Zosterops japonicus*	NN	✓	✓
White-rumped shama	*Copsychus malabaricus*	NN	✓	
Zebra dove	*Geopelia striata*	NN	✓	✓

Status: I = Indigenous, E = Endemic, NN = Non-native established species, M = Migrant.

1. Protected by the Migratory Bird Treaty Act (MBTA).

2. Listed as federally and state endangered.

3. Listed as federally threatened and state endangered.

Listed Waterbirds: Endangered Hawaiian common gallinule were seen at three general locations within the Nukoli'i Beach portion of the Study Area (Figure 8). During the November 2024 survey, one adult Hawaiian common gallinule was observed foraging along the western side of Kaua'i Beach Road within the grassy ROW near the curve in the road. A pair of gallinules with a brood of three juveniles were observed in the ditch along Kaua'i Beach Road roughly 20 feet (6 m) west of the Study Area (Appendix A, Photo 14). An additional adult was observed north of the Study Area along the ditch slope north of Kaua'i Beach Drive during the November 2024 survey, and in April 2025 two adults were observed in the

same general location (Appendix A, Photo 15; Figure 8). This species is likely to regularly use the ditch immediately adjacent to the Study Area. Hawaiian common gallinule generally nest in dense emergent vegetation over shallow freshwater, in wet meadows, or on banks of waterways (USFWS 2011, Bannor and Kiviat 2020). Although no suitable nesting habitat is present within the Study Area, nesting may occur in the immediate vicinity.

Two Hawaiian ducks (assumed to be pure, not hybrids) were observed flying over the eastern portion of the Study Area during the November 2024 survey. Hawaiian ducks occur in a variety of wetland types, including freshwater marshes, coastal ponds, streams, flooded fields, taro fields, ditches, reservoirs, and sewage treatment ponds (Engilis et al. 2020, Uyehara et al. 2008). Hawaiian ducks have previously been recorded at the beach park and along Kauaʻi Beach Road (ebird 2021), and could forage and loaf in the adjacent ditch. On Kauaʻi, nesting has been reported along streams and ditches (Engilis et al. 2020); thus, although no suitable nesting habitat is present within the Study Area, nesting may occur in the immediate vicinity.

A single Hawaiian stilt was observed outside of the Study Area on the grassy lawn north of the Nukoliʻi Beach Park bathrooms during the November 2024 survey. Hawaiian stilts may opportunistically use grassy lawns or upland fields within the Study Area and vicinity for foraging and loafing. Hawaiian stilts have previously been recorded at the beach park and at the nearby Outrigger Resort (ebird 2021). Hawaiian stilts tend to nest in shallow freshwater wetlands on dikes, islands, or other high spots with sparse emergent vegetation cover and have a strong tendency to nest in human made impoundments (Robinson et. al 2020). No suitable nesting habitat for Hawaiian stilts occurs in the Study Area.

No Hawaiian coots/ ʻalae keʻokeʻo (*Fulica alai*) were observed during the surveys; however, this species has been recorded in the vicinity of the beach park (ebird 2021). Hawaiian coots breed in freshwater ponds, flooded taro fields, reservoirs, concrete-lined sewage-treatment ponds, and brackish fishponds. Nests are often adjacent to relatively deep bodies of water and on the margin of emergent vegetation or anchored to floating mats (Pratt and Brisbin 2020). This species could occur or nest in the ditch adjacent to the Study Area.

No listed waterbirds were observed at the KCC portion of the Study Area during the surveys; however, Hawaiian ducks, Hawaiian common gallinule, and Hawaiian stilts have previously been recorded on the campus (ebird 2021).

Hawaiian Goose/ Nēnē: The federally threatened/ state endangered nēnē use various habitat types ranging from coastal to subalpine environments including beach strand, shrubland, grasslands, shrublands, and lava rock (Banko 1988, Banko et al. 2020). They are also known to use landscaped/maintained areas, such as golf courses, grazed agricultural areas, playing fields, and lawns. Although they are not obligate waterbirds, nēnē also use surface waters, such as wetlands, reservoirs, and streams (USFWS 2021). Nesting occurs in a variety of habitats, but typically nests are well concealed under shrubs (Banko et al. 2020).

During the November 2024 survey, two nēnē were observed grazing immediately adjacent to the Nukoli‘i Beach portion of the Study Area north of Kaua‘i Beach Drive. A family of four nēnē were observed grazing along the western slope of the ditch immediately north of Kaua‘i Beach Drive during the April 2025 survey (Appendix A, Photo 16; Figure 8). Nēnē have also been recorded at the beach park and along Kaua‘i Beach Road (eBird 2021). Although no nēnē were observed at the KCC portion of the Study Area during the surveys, nēnē have been recorded transiting the campus (Wilson Okamoto Corporation 2011, ebird 2021).

Listed Seabirds: The endangered Hawaiian petrel/ ‘ua‘u (*Pterodroma sandwichensis*), threatened Newell’s shearwater/ ‘a‘o (*Puffinus newelli*), and endangered band-rumped storm-petrel/ ‘akē‘akē (*Hydrobates castro*) (collectively referred to as listed seabirds) have not been documented in the Study Area, and suitable nesting habitat does not occur in the Study Area. However, these birds have the potential to fly over the Study Area at night between March and December while transiting between nest sites in upper elevations of the island and the ocean. These listed seabirds are known to be attracted to outdoor lighting at night; after circling the lights, they can become exhausted and collide with nearby structures or fall to the ground (USFWS 2023b).

4.2.2 Terrestrial Mammals

Two non-native terrestrial mammalian species were detected in the area during the surveys. Feral pig (*sus scrofa*) evidence and off-leash domestic dogs (*Canis familiaris*) were seen in the Study Area. Although not observed during the surveys, other introduced mammals, such as rats (*Rattus* spp.) and feral cats (*Felix catus*) are likely to occur within the Study Area.

Recent studies have found that Hawai‘i’s only native, extant terrestrial mammal—the endangered Hawaiian hoary bat—is more abundant across the Hawaiian Islands than previously understood (Gorresen et al. 2013, Bonaccorso et al. 2015, USGS 2019). This species will forage in open and semi-cluttered landscapes in a wide range of habitats and vegetation types, such as in open areas, at forest edges or within gaps, and over open water bodies including streams, ponds, and along shorelines (Jacobs 1994, Jacobs 1999, Bonaccorso et al. 2015, Pinzari et al. 2019). Hawaiian hoary bats are tree-roosting bats and roost in various native and non-native trees (USFWS 1998, Gorresen et al. 2013, Montoya-Aiona et al. 2023). Trees within or overhanging the Nukoli‘i Beach portion of the Study Area (e.g., ficus, ironwood, hau, false kamani, and monkeypod) are over 15 feet (4.6 m) tall and have the potential to function as bat roost trees. Large trees within the KCC campus also have the potential to function as bat roost trees due to their size (DOFAW 2015, USFWS 2023b). Thus, Hawaiian hoary bats may transit, roost, or forage in portions of the Study Area.

4.2.3 Invertebrates

Large and conspicuous invertebrates incidentally observed during the surveys are listed in Table 6. Along the shoreline, shore flies (Ephydridae) were abundant within the Nukoli‘i Beach portion of the Study Area. These flies could not be identified to genus, but many shore flies are native to Hawai‘i. Two native

dragonfly species, the globe skimmer (*Pantala flavescens*) and green darner (*Anax junius*) were also recorded.

Table 6. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity

Common/Hawaiian Name	Scientific Name	Status	Nukoli'i Beach	KCC
Carpenter bee	*Xylocopa sonorina*	NN	✓	
Crab spider	Mecaphesa*	NN	✓	
Flesh fly	Sarcophagidae*	NN		✓
Giant African snail	*Achatina fulica*	NN	✓	
Globe skimmer	*Pantala flavescens*	I	✓	
Green darner	*Anax junius*	I	✓	
Large orange sulphur	*Phoebis agarithe*	NN	✓	
Monarch	*Danaus plexippus*	NN	✓	
Pea blue	*Lampides boeticus*	NN	✓	
Shore fly	Ephydridae*	Unknown	✓	
Spotless lady beetle	*Cycloneda sanguinea*	NN	✓	
Western honeybee	*Apis mellifera*	NN	✓	

Status: E = Endemic, I = Indigenous, NN = Non-native species.

* = Represents order or family because lower taxonomic identification could not be made in the field.

4.2.4 Sea Turtles and Marine Mammals

No sea turtles, monk seals, or other marine mammals were observed in the Study Area during the surveys. However, NOAA has documented green sea turtles previously nesting at Nukoli'i Beach (Parker and Balazs 2015), and the beach is proposed as terrestrial critical habitat for green sea turtle (USFWS 2023a). In Hawai'i, green sea turtles mostly nest on sandy beaches close to where they hatched (USFWS 2023a, NOAA 2023b). Green sea turtles also forage in shallow reefs throughout the main Hawaiian Islands where their food source is plentiful (Balazs et al. 1987); therefore, it is possible green sea turtles could also forage offshore of the Study Area.

No Hawaiian monk seals were observed during the surveys. Hawaiian monk seals spend most of their time in the ocean, but also haul out on land for resting, pupping, nursing, molting, and avoiding predators. They primarily haul out on sandy beaches, but also utilize coral rubble, rocky and volcanic substrates (NMFS 2007, NOAA 2011). Monk seals could haul out on the sandy shoreline at Nukoli'i Beach in the vicinity of the Study Area.

The endangered hawksbill sea turtle (*Eretmochelys imbricata*) is a rare sea turtle species that uses similar feeding grounds to the green sea turtle (Gaos et. al. 2020) and nests on a wide range of

substrates (USFWS 2023b). There is a lack of available information on the nesting and foraging locations for this species in Hawai'i; however, based on the possible presence of food resources in the nearby marine environment, hawksbill sea turtles have the potential to forage in the marine environment offshore of the Study Area.

5.0 Conclusions and Recommendations

As described in Section 4, many of the plants and animals observed in the Study Area are non-native to the Hawaiian Islands. Two federal and state listed bird species were observed within the Nukoli'i Beach portion of the Study Area during the biological surveys, and an additional two listed bird species were recorded in the vicinity. One endangered plant species is planted within the KCC portion of the Study Area. Although not observed, several other listed wildlife species have the potential to occur in or transit through the Study Area, such as additional listed waterbirds, listed seabirds, and the Hawaiian hoary bat. Recommended measures to avoid and minimize impacts to these species are outlined below.

5.1 General

In addition to the species-specific measures detailed below, Tetra Tech recommends the following general measures to avoid and minimize impacts to biological resources:

- Although non-native weedy species are common in the Study Area, invasive species minimization measures should be implemented to avoid unintentional introduction or transport of new invasive species to the area. This includes: utilizing on-site gravel, rock, and soil (or purchasing from a local supplier) when practicable; utilizing certified, weed-free seed mixes; minimizing the movement of plant or soil material between worksites and islands; and washing construction equipment and/or visually inspecting equipment for excessive debris, plant materials, and invasive or harmful non-native species as appropriate. Suspect invasive pests can be reported through the statewide pest hotline at www.643pest.org or 808-643-PEST (643-7378.
- Establish an environmental education and observation program for all construction and operational personnel. Staff should be trained to identify listed wildlife, MBTA-protected birds, or rare plants that may be found on-site (e.g., Hawaiian common gallinule, nēnē, loulu) and to take appropriate steps if listed wildlife species are found.
- If downed listed wildlife species are observed at the Project, notify USFWS and DOFAW as soon as possible.

5.2 Plants

Overall, the vegetation in the Study Area is modified and disturbed from current land use activities, and non-native plants dominate. Thirteen native plant species were recorded in the Study Area during the surveys, five of which only occur as ornamental plantings. No wild listed or rare plant species were observed during the surveys; however, one endangered plant species—loulu (*Pritchardia napaliensis*)—

is planted within the KCC portion of the Study Area. Tetra Tech recommends the following measures to avoid and minimize potential impacts to native plants:

- Design the Project to avoid take[3] of the endangered *P. napaliensis* individuals on the KCC campus. If work will occur in the vicinity of the palms, prior to construction, mark an appropriate buffer with highly visible, temporary fencing and appropriate signage to prevent disturbance in the area.
- If take of the endangered *P. napaliensis* cannot be avoid, consult with USFWS and DOFAW on whether the plants are protected by federal and state law as they are assumed to be planted for ornamental purposes.
- If landscaping is installed as part of the Project, use non-invasive plants and incorporate native plant species to the maximum extent practicable.

5.3 Wildlife

Although the majority of the wildlife recorded in the Study Area are not native to the Hawaiian Islands, several listed birds were recorded in the Study Area and immediate vicinity, and several of these species could nest in the vicinity. Recommendations for the listed animal species that were observed and others that have the potential to occasionally occur in or transit the Study Area are directed below.

5.3.1 Listed Waterbirds

All four listed waterbirds (Hawaiian gallinules, Hawaiian ducks, Hawaiian stilts, and Hawaiian coots) have the potential to occur in the Study Area or immediate vicinity due to the surface water. Hawaiian gallinules, Hawaiian ducks, and Hawaiian coots could also nest in the immediate vicinity of the Study Area. To avoid impacts to listed waterbirds during Project construction and operation, Tetra Tech recommends the following based on avoidance and minimization measures provided by USFWS (2023b):

- Avoid creating additional areas with standing water.
- Post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered birds on-site.
- Prior to project initiation, have a qualified biologist conduct Hawaiian waterbird nest surveys where appropriate habitat occurs within the vicinity of the Project Area. Nest surveys should be conducted within 3 days before any work is conducted and after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest). If a nest or active brood is found:

[3] "Take" is defined under HRS 195D-2 as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect endangered or threatened species of aquatic life or wildlife, or to cut, collect, uproot, destroy, injure, or possess endangered or threatened species of aquatic life or land plants, or to attempt to engage in any such conduct". Similarly, "Take" is defined under the ESA of 1973 (16 U.S.C. § 1532) as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct."

  - Contact USFWS and DOFAW within 48 hours.
  - Establish and maintain a 100-foot (30 m) buffer around all active nests and/or broods until the chicks/ducklings have fledged. Do not conduct potentially disruptive activities or habitat alteration within this buffer.
  - Have a biological monitor that is familiar with the species' biology present on the project site during all construction or earth moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.
- If listed waterbirds are found in the Project Area during active construction, cease all activities within 100 feet (30 m) of the bird(s), and do not approach the bird(s). Work may continue after the bird leaves the area of its own accord. Consider using a qualified biological monitor during active construction to maintain the 100-foot buffer from all listed waterbirds.

5.3.2 Nēnē

Nēnē were observed during the biological surveys, and the Study Area provides suitable foraging habitat for this species. Nēnē also have the potential to be attracted to the Study Area during or after construction if additional foraging habitat is created (i.e., mowed lawns). Should this species land within the Study Area, it could be impacted by construction and operation activities. Tetra Tech recommends the following avoidance measures modified from USFWS (2023b) and DOFAW:

- Do not approach, feed, or disturb nēnē.
- If a nēnē is found in the Study Area during active construction, cease all activities within 100 feet (30 m) of the bird, and do not feed, approach, or disturb the bird. Work may continue after the bird leaves the area of its own accord.
- If nēnē are observed loafing or foraging within the Study Area during the breeding season (September through April), a biologist familiar with nesting behavior should survey for nests in the area prior to the resumption of work. If a nest is discovered, contact USFWS and DOFAW and cease all work within 150 feet (46 m). If a nest is not discovered, work may continue after the bird leaves the area of its own accord.

5.3.3 Listed Seabirds

The Study Area does not provide suitable nesting or foraging habitat for the three listed seabirds. However, individuals may fly over the area during the breeding, nesting, and fledging seasons (March 1 - December 15) and may be attracted to nighttime lighting. Disorientation and fallout as a result of light attraction could occur for individuals attracted to unshielded nighttime lighting. Juvenile birds are particularly vulnerable to light attraction, and grounded birds are vulnerable to mammalian predators or vehicle strikes (Rodríguez et al. 2017). Tetra Tech recommends the following measures to avoid and minimize potential impacts to listed seabirds:

- If operational on-site lighting is required, it should consist of fixtures that will be shielded and/or directed downward to prevent upward radiation, triggered by a motion detector, and fitted with non-white light bulbs to the extent possible.
- Avoid the use of nighttime lighting that could attract seabirds during the seabird peak fallout period (September 15 - December 15).
- If a grounded seabird is found at the Project, contact USFWS and DOFAW immediately. These agencies may recommend contacting Save Our Shearwaters at (808) 635-5117.
- Minimize construction of overhead lines to reduce potential collision risk for seabird species.

5.3.4 Hawaiian Hoary Bat

Direct impacts to bats could occur if roost trees are disturbed or through the use of barbed wire. Tetra Tech recommends the following avoidance measures provided by USFWS (2023b):

- To prevent entanglement, do not use barbed wire for fencing.
- Do not trim, disturb, or remove woody vegetation taller than 15 feet (4.6 m) between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

5.3.5 Sea Turtles and Marine Mammals

No sea turtles or marine mammals were detected within the Study Area during the surveys, but critical habitat for green sea turtles and monk seals is present within or adjacent to the Study Area, and both monk seals and sea turtle species have the potential to forage in the nearshore waters. Tetra Tech recommends following the Standard Local Operating Procedures for Endangered Species in the Central and Western Pacific Region (Pac-SLOPES) provided by U.S. Army Corps of Engineers (USACE 2022) to minimize impacts to ESA-listed marine species (sea turtles, marine mammals, sharks, rays) and their habitats. Tetra Tech also recommends the following avoidance measures adapted from USFWS (2023b):

- Do not use vehicles on or modify the beach area during the sea turtle nesting or hatching season (May through December).
- Have a biologist (or qualified, trained individual) familiar with sea turtles and monk seals conduct a visual survey of the project site immediately prior to work to ensure no sea turtles or monk seals are present. If these species are found within the project area, cease all mechanical or construction activities within 100 feet (30 m) until the animal voluntarily leaves the area.
- Remove any project-related debris, trash, or equipment from the beach/shoreline if not actively being used.
- Do not stockpile project-related materials in the intertidal zone, reef flats, sandy beach, and adjacent vegetated areas.
- Incorporate applicable USFWS best management practices regarding Work in Aquatic Environments (USFWS 2022).

- Avoid nighttime work during the nesting (May-September) and hatching season (November-December) of sea turtles.
- Minimize the use of lighting on or near beaches and shield all project-related lights so the light is not visible from the beach/shoreline.
- Incorporate design measures into the construction or operation of buildings adjacent to the beach/shoreline to reduce ambient outdoor lighting.

6.0 References

Balazs, G.H., R.G. Forsyth, and A.K.H. Kam. 1987. Preliminary Assessment of Habitat Utilization by Hawaiian Green Turtles in their Resident Foraging Pastures. National Oceanic and Atmospheric Administration. NOAA Technical Memorandum Series NOAA-TM-NMFS-SWFC; 71. Accessed November 2024. https://repository.library.noaa.gov/view/noaa/5758.

Banko, P.C. 1988. Breeding biology and conservation of the Nēnē, Hawaiian goose (*Nesochen sandvicensis*). Ph.D. dissertation, University of Washington, Seattle.

Bannor, B.K. and E. Kiviat. 2020. Common Gallinule (*Gallinula galeata*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.comgal1.01

Banko, P.C., J.M. Black, and W.E. Banko. 2020. Hawaiian Goose (*Branta sandvicensis*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. Accessed November 2024. https://doi.org/10.2173/bow.hawgoo.01

Billerman, S.M., B.K. Keeney, P.G. Rodewald, and T.S. Schulenberg (Editors). 2022. Birds of the World. Cornell Laboratory of Ornithology, Ithaca, NY, USA. Accessed November 2024. https://birdsoftheworld.org/bow/home.

Bonaccorso, F.J., C.M. Todd, A.C. Miles, and P.M. Gorresen. 2015. Foraging Range Movements of the Endangered Hawaiian Hoary Bat, *Lasiurus cinereus semotus*. Journal of Mammalogy 96(1):64-71.

CWRM (State of Hawaii, Department of Land and Natural Resources: Commission on Water Resource Management). 2019. Water Resource Protection Plan. Prepared by Townscape, Inc. Accessed November 2024. https://files.hawaii.gov/dlnr/cwrm/planning/wrpp2019update/WRPP_ALL_201907.pdf.

CWRM. 2022. Surface water hydrologic unit boundaries for the 8 major Hawaiian Islands as of August 2022. Layer Name: Watersheds (CWRM). Accessed November 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::watersheds/explore?location=19.907608%2C-155.475058%2C8.18.

DAR (State of Hawai'i Division of Aquatic Resources). 2008. Streams (both perennial and non-perennial). Accessed November 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::streams/about.

DOFAW (State of Hawai'i, Department of Land and Natural Resources: Division of Forestry and Wildlife). 2015. Endangered Species Recovery Committee Hawaiian Hoary Bat Guidance Document.

eBird. 2021. eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York. Accessed November 2024. http://www.ebird.org.

Gaos, A.R., E.L. LaCasella, L. Kurpita, G. Balazs, S. Hargrove, C. King, H. Bernard, T.T. Jones, and P.H. Dutton. 2020. Hawaiian Hawksbills: A Distinct and Isolated Nesting Colony in the Central North Pacific Ocean Revealed by Mitochondrial DNA. Conservation Genetics, 21: 771–783. https://doi.org/10.1007/s10592-020-01287-1.

Gorresen, P.M., F.J. Bonaccorso, C.A. Pinzari, C.M. Todd, K. Montoya-Aiona, and K. Brinck. 2013. A five-year study of Hawaiian hoary bat (*Lasiurus cinereus semotus*) occupancy on the island of Hawai'i. Technical Report HCSU-041. Hawai'i Cooperative Studies Unit, University of Hawai'i at Hilo, Hilo, HI. July 2013.

Jacobs, D.S. 1994. Distribution and abundance of the endangered Hawaiian hoary bat, *Lasiurus cinereus semotus*, on the island of Hawai'i. Pacific Science. 48(2): 193-200.

Jacobs, D.S. 1999. The diet of the insectivorous Hawaiian hoary bat (*Lasiurus cinereus semotus*) in an open and a cluttered habitat. Canadian Journal of Zoology. 77: 1603-1608. 10.1139/z99-110.Magnacca, K.N., and C. King. 2013. Assessing the presence and distribution of 23 Hawaiian yellow-faced bee species on lands adjacent to military installations on O'ahu and Hawai'i Island. Pacific Cooperative Studies Unit, University of Hawai'i at Mānoa. Technical Report 185.

Montoya-Aiona, K., P.M. Gorresen, K.N. Courtot, A. Aguirre, F. Calderon, S. Casler, S. Ciarrachi, J. Hoeh, J.L. Tupu, and T. Zinn. 2023. Multi-scale assessment of roost selection by 'ōpe'ape'a, the Hawaiian hoary bat (*Lasiurus semotus*). Plos one, 18(8): e0288280.

NMFS (National Marine Fisheries Service). 2007. Recovery plan for the Hawaiian monk seal (*Monachus schauinslandi*), Revision. https://repository.library.noaa.gov/view/noaa/3521.

NOAA (National Oceanic and Atmospheric Administration). 2011. Endangered and Threatened Wildlife and Plants: Proposed Rulemaking to Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 76 (106): 32026 –32063.

NOAA. 2015. Endangered and Threatened Wildlife and Plants: Final Rulemaking To Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 80 (162): 50926–50988.

NOAA. 2023a. National ESA Critical Habitat Mapper (v1.0) by the National Marine Fisheries Service. Accessed November 2024. https://www.fisheries.noaa.gov/resource/map/national-esa-critical-habitat-mapper.

NOAA. 2023b. Endangered and Threatened Wildlife and Plants: Proposed Rule To Designate Marine Critical Habitat for Six Distinct Population Segments of Green Sea Turtles. Federal Register. 88(137): 46572–46671.

NRCS (Natural Resources Conservation Service). 2024. Web Soil Survey. Accessed April 2025. http://websoilsurvey.nrcs.usda.gov/.

NRCS NWCC (Natural Resources Conservation Service, National Water and Climate Center). 2025. Retrieve Weather Data and Summary Reports from AgACIS, Monthly Total Precipitation for Monthly Total Precipitation for LIHUE WSO AP 1020.1, HI. Accessed April 2025. https://www.nrcs.usda.gov/resources/guides-and-instructions/agacis-weather-data-and-products.

NWS (National Weather Service). 2024. Drought Information Statement For the Main Hawaiian Islands Valid October 11, 2024. Accessed November 2024. https://www.weather.gov/hfo/DroughtInformationStatement.

NWS 2025a. Precipitation Summaries. Accessed May 2025. https://www.weather.gov/hfo/hydro_summary.

NWS. 2025b. Drought Information Statement For the Main Hawaiian Islands Valid May 15, 2025. Accessed May 2025. https://www.weather.gov/hfo/DroughtInformationStatement.

Nishida, G. 2002. Hawaiian Terrestrial Arthropod Checklist. 4th Edition. Hawai'i Biological Survey Bishop Museum.

Parker, D. and G. Balazs. 2015. Map Guide to Marine Turtle Nesting and Basking in the Hawaiian Islands. NOAA-PIFSC Marine Turtle Research Program. Accessed April 2025. https://georgehbalazs.com/wp-content/uploads/2018/11/HawaiianIs_2015-PIFSC-DataMappingProduct.pdf

Pinzari, C., R. Peck, T. Zinn, D. Gross, K. Montoya-Aiona, K. Brinck, M. Gorressen, and F. Bonaccorso. 2019. Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) activity, diet and prey availability at the Waihou Mitigation Area, Maui. Technical Report HCSU-090. Hawai'i Cooperative Studies Unit, University of Hawai'i at Hilo, Hilo, Hawai'i. June 2019.

Pratt, H.D. and I. L. Brisbin Jr. 2020. Hawaiian Coot (*Fulica alai*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.hawcoo.01

Price, J. P., J. Jacobi, D., S.M. Gon (III), D. Matsuwaki, L. Mehrhoff, W. Wagner, M. Lucas, and B. Rowe. 2012. Mapping plant species ranges in the Hawai'ian Islands—Developing a methodology and associated GIS layers. U.S. Geological Survey Open-File Report 2012–1192, 34 p., one appendix (species table), 1,158 maps. http://pubs.usgs.gov/of/2012/1192/.

Robinson, J. A., J. M. Reed, J. P. Skorupa, and L. W. Oring. 2020. Black-necked Stilt (*Himantopus mexicanus*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA.

Rodríguez, A., N.D. Holmes, P.G. Ryan, K.-J. Wilson, L. Faulquier, Y. Murillo, A.F. Raine, J.F. Penniman, V. Neves, B. Rodríguez, J.J Negro, A. Chiaradia, P. Dann, T. Anderson, B. Metzger, M. Shirai, L.

Deppe, J. Wheeler, P. Hodum, C. Gouveia, V. Carmo, G.P. Carreira, L. Delgado-Alburqueque, C. Guerra-Correa, F.-X. Couzi, M. Travers and M.L. Corre. 2017. Seabird mortality induced by land-based artificial lights. Conservation Biology, 31: 986-1001.

Staples G. W., and D. R. Herbst. 2005. A Tropical Garden Flora: Plants cultivated in the Hawaiian Islands and other tropical places. Bishop Museum Press.

Tomich, P.Q. 1986. Mammals in Hawaii. Bishop Museum Press, Honolulu, HI. 375 pp.

USACE (U.S. Army Corps of Engineers). 2022. Pac-Slopes BMPS. Revised: 02 March 2022. Provided to Tetra Tech by USACE on March 6, 2023.

USFWS (U.S. Fish and Wildlife Service). 1998. Recovery Plan for the Hawaiian hoary bat (*Lasiurus cinereus semotus*). U.S. Fish and Wildlife Service, Portland, OR.

USFWS. 2011. Recovery plan for Hawaiian Waterbirds, Second Revision. October 28, 2011.

USFWS. 2021. Hanalei National Wildlife Refuge Wetlands Management and Waterbird Conservation Plan. Prepared by U.S. Fish and Wildlife Service and Hanalei National Wildlife Refuge. February 2021.

USFWS. 2022. Best Management Practices for Work in or Around Aquatic Environments. Accessed November 2024. https://www.fws.gov/sites/default/files/documents/Best%20Management%20Practices%20For%20Work%20In%20or%20Around%20Aquatic%20Environment-April%202022.pdf.

USFWS. 2023a. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Green Sea Turtle. Federal Register. 88 (137): 46376- 46570.

USFWS. 2023b. Animal Avoidance and Minimization Measures. Accessed November 2024. https://www.fws.gov/sites/default/files/documents/Animal Avoidance and Minimization Measures - FINAL May 2023_0.pdf.

USFWS. 2024. National Wetlands Inventory. Wetlands Data by State, Hawai'i. Accessed November 2024. https://www.fws.gov/node/264847.

USGS (U.S. Geologic Survey). 2019. Ecology and Distribution of the Endangered Hawaiian Hoary Bat. Accessed November 2024. https://www.usgs.gov/pacific-island-ecosystems-research-center/science/ecology-and-distribution-endangered-hawaiian#:~:text=Distribution%20and%20seasonal%20altitudinal%20migration,appears%20to%20occur%20was%20documented.

USGS. 2023. National Hydrography Dataset. Accessed November 2024. https://www.usgs.gov/national-hydrography/access-national-hydrography-products.

Uyehara, K. J., A. Engilis, and B.D. Dugger. 2008. Wetland features that influence occupancy by the endangered Hawaiian duck. The Wilson Journal of Ornithology 120(2): 311-319.

Wagner, W.L., D.R. Herbst, and D.H. Lorence. 2023. Flora of the Hawaiian Islands website. Accessed November 2024. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm.

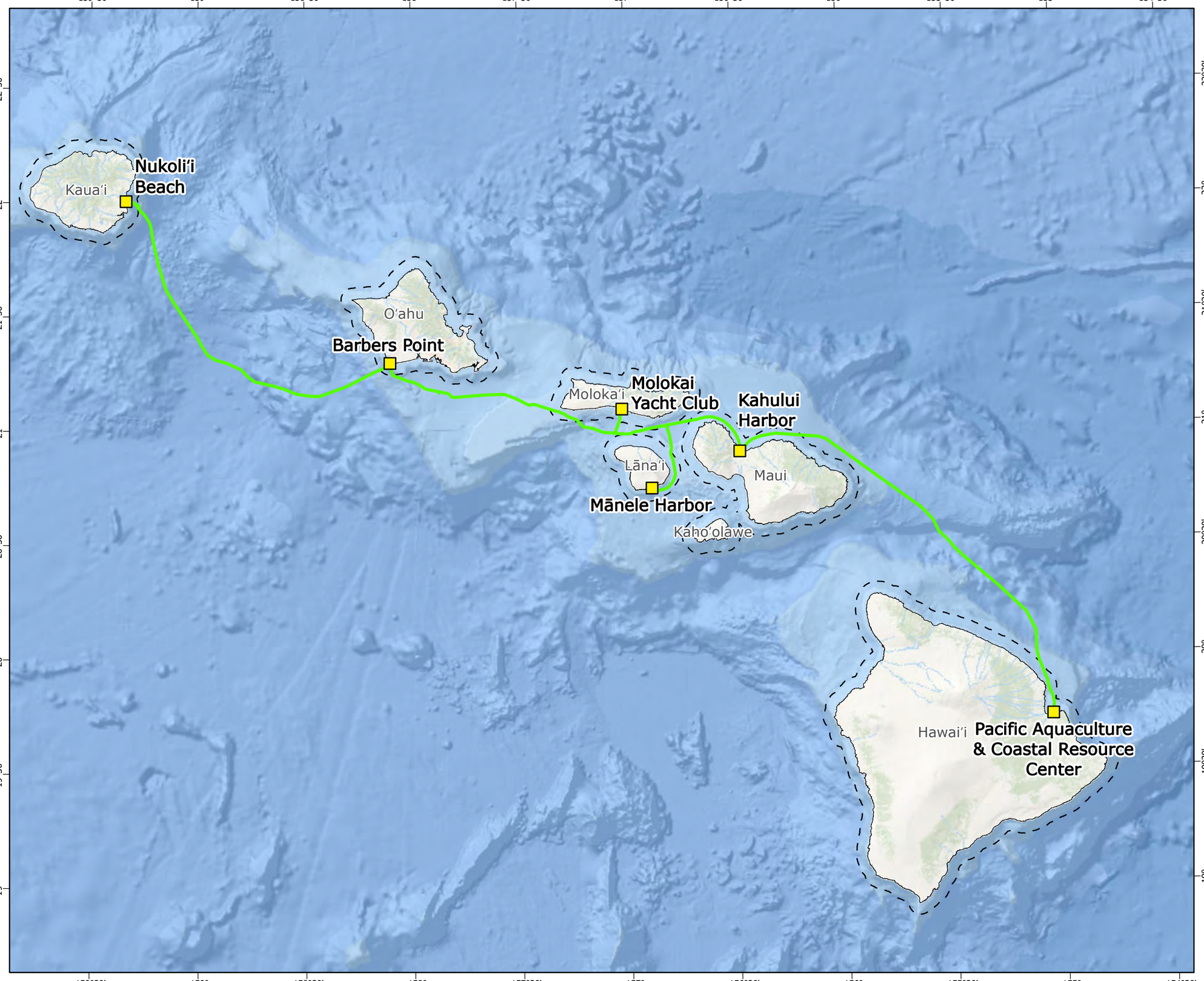
Wilson Okamoto Corporation. 2011. Draft Environmental Assessment Kauai Community College Resignation to Urban District. Accessed November 2024. https://files.hawaii.gov/dbedt/erp/EA_EIS_Library/2011-05-08-KA-DEA-Kauai-Comm-College-Urban-District.pdf.

WoRMS (World Register of Marine Species) Editorial Board. 2024. Accessed November 2024. https://www.marinespecies.org/aphia.php?p=search.

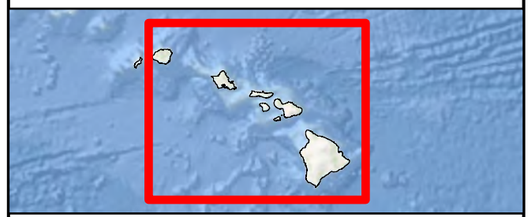
Figures

Hawaiian Islands Fiber Link

Figure 1
Project Overview



- Subsea Cable
- Cable Landing Site
- State Waters Limits (3 nautical miles)



0 20 40 80 120
Kilometers

0 10 20 40
Nautical Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\ProjectOverview_20240514\ONI_HIFL_ProjectOverview_20240801.aprx

Hawaiian Islands Fiber Link Project - Kaua'i Cable Landing Site

Figure 2
Project Study Area and Vicinity

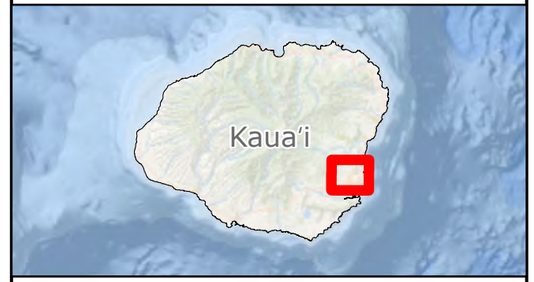


- Study Area
- Highway
- Roads

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.5 1
Miles

0 1,900 3,800
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 06/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\MapsIBioReport_Nukolii_20250603.aprx

-159°20'30"

22°0'30"

Kūhiō Hwy

Kauai Beach Dr

(4)3-7-003-017

(4)3-7-003-999

(4)3-7-003-007

Kauai Beach Rd

Hawaiian Islands Fiber Link Project - Kaua'i Cable Landing Site

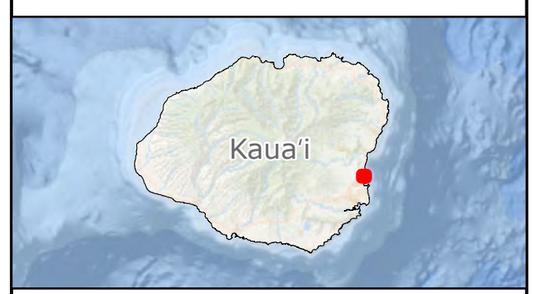
Figure 3A
Project Study Area and Vicinity: Nukoli'i Beach

Study Area

TMK Parcel

Roads

The study area boundaries were developed using professional survey data to ensure proper alignment with the legal lot boundaries, where applicable. The publicly available TMK dataset is provided for context, but has varying spatial accuracy standards and may not perfectly match other data layers as specified in the underlying metadata.



0 0.05 0.1

Miles

0 200 400

Feet

N

W E

S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\MapsIBioReport_Nukolii_20250603\ONI_HIFL_BioReport_Nukolii_20250603.aprx

-159°24'

-159°23'30"

21°58'

(4)3-4-007-003

Kaumualiʻi Hwy

Hawaiian Islands Fiber Link Project - Kauaʻi Cable Landing Site

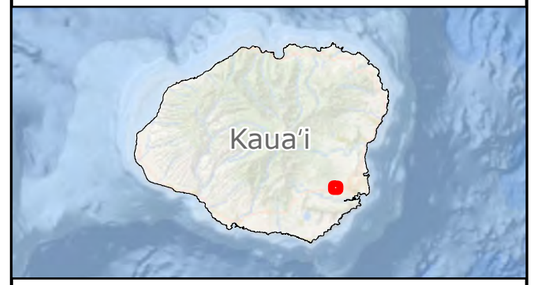
Figure 3B
Project Study Area and Vicinity: Kauaʻi Community College

Study Area

TMK Parcel

Roads

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1

Miles

0 200 400

Feet

N

W E

S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 06/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\cess706gisfs1\CESI\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Nukolii_20250603\ONI_HIFL_BioReport_Nukolii_20250603.aprx

-159°20'30"

22°0'30"

Kūhiō Hwy

Kauai Beach Dr

Kauai Beach Rd

Hawaiian Islands Fiber Link Project - Kaua'i Cable Landing Site

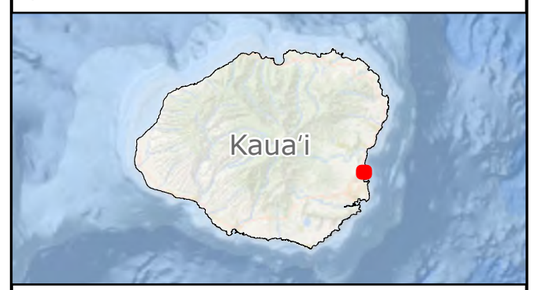
Figure 4A
Soils within Study Area: Nukoli'i Beach

- Study Area
- Roads

NRCS Soil Unit

- BS - Beaches
- Fd - Fill land
- LhE2 - Lihue silty clay, 25 to 40 percent slopes, eroded
- LlB - Lihue gravelly silty clay, 0 to 8 percent slopes
- LlC - Lihue gravelly silty clay, 8 to 15 percent slopes
- Mr - Mokuleia fine sandy loam
- Mta - Mokuleia clay loam, poorly drained variant

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1
Miles

0 200 400
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 06/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Nukoli_20250603\ONI_HIFL_BioReport_Nukoli_20250603.aprx

-159°24'

-159°23'30"

21°58'

Kaumualiʻi Hwy

Hawaiian Islands Fiber Link Project - Kauaʻi Cable Landing Site

Figure 4B
Soils within Study Area: Kauaʻi Community College

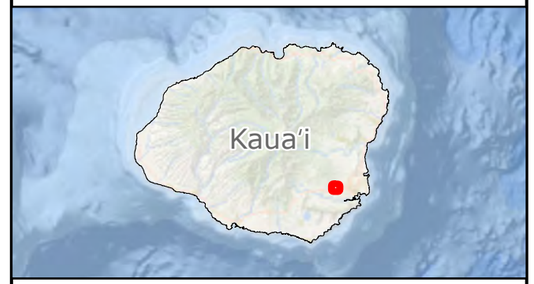
Study Area

Roads

NRCS Soil Unit

PnB - Puhi silty clay loam, 3 to 8 percent slopes

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1

Miles

0 200 400

Feet

N

W E

S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 06/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Nukolii_20250603.aprx

-159°20'30"

22°0'30"

Kūhiō Hwy

Kauai Beach Dr

Kauai Beach Rd

Kawailoa Stream

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.

Hawaiian Islands Fiber Link Project - Kaua'i Cable Landing Site

Figure 5A
Water Resources Mapped by NWI, NHD, and DAR: Nukoli'i Beach

- Study Area
- Roads

National Wetlands Inventory

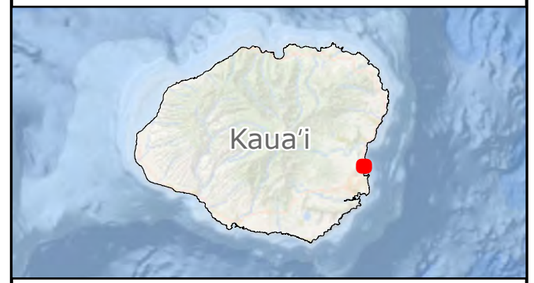
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

National Hydrography Dataset

- Canal/Ditch
- Perennial Stream
- Waterbody

Division of Aquatic Resources

- Stream



0 0.05 0.1
Miles

0 250 500
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 06/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\MapsIBioReport_Nukolii_20250603\ONI_HIFL_BioReport_Nukolii_20250603.aprx

-159°24'

-159°23'30"

21°58'

Pu'ali Stream

Kaumuali'i Hwy

Hawaiian Islands Fiber Link Project - Kaua'i Cable Landing Site

Figure 5B
Water Resources Mapped by NWI, NHD, and DAR: Kaua'i Community College

Study Area

Roads

National Hydrography Dataset

Canal/Ditch

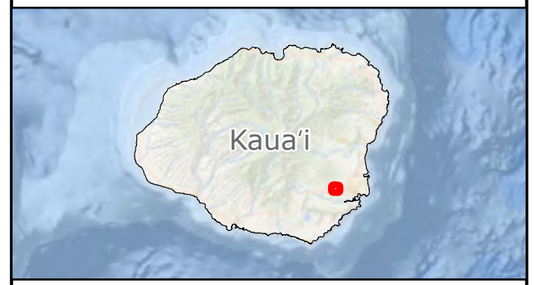
Perennial Stream

Waterbody

Division of Aquatic Resources

Stream

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1
Miles

0 250 500
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 06/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\MapsIBioReport_Nukolii_20250603.aprx

-159°20'25"

22°0'25"

Kūhiō Hwy

Kauai Beach Dr

Kauai Beach Rd

Hawaiian Islands Fiber Link Project - Kaua'i Cable Landing Site

Figure 6
Critical Habitat Within the Study Area and Vicinity

Study Area

Roads

Proposed Green Sea Turtle *(Chelonia mydas)* Critical Habitat

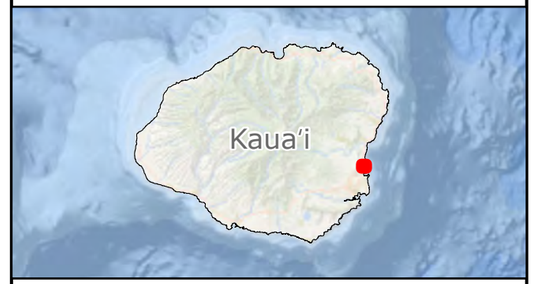
Marine

Terrestrial

Monk Seal *(Neomonachus schauinslandi)* Critical Habitat

Marine

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1

Miles

0 250 500

Feet

N

W E

S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 06/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\MapsIBioReport_Nukolii_20250603.aprx

-159°23'45"

21°58'20"

21°57'55"

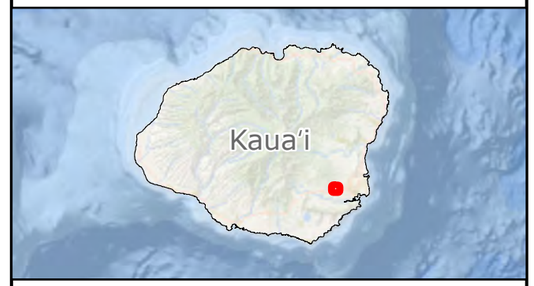
Kaumuali'i Hwy

Hawaiian Islands Fiber Link Project - Kaua'i Cable Landing Site

Figure 7
Locations of Listed Plants in the Study Area

- Study Area
- Highway
- Roads
- Loulu *(Pritchardia napaliensis)*

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1
Miles

0 250 500
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 06/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\MapsIBioReport_Nukolii_20250603\ONI_HIFL_BioReport_Nukolii_20250603.aprx

-159°20'25"

22°0'25"

Kūhiō Hwy

Kauai Beach Dr

Kauai Beach Rd

Hawaiian Islands Fiber Link Project - Kaua'i Cable Landing Site

Figure 8
Observations of Listed Birds

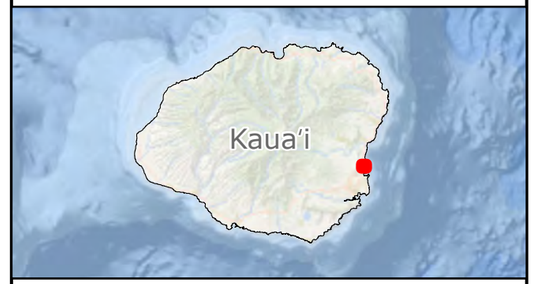
Study Area

Roads

Observations

- Hawaiian Common Gallinule/ 'Alae 'Ula
- Hawaiian Goose/ Nēnē

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1
Miles

0 250 500
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 06/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\MapsIBioReport_Nukolii_20250603\ONI_HIFL_BioReport_Nukolii_20250603.aprx

Appendix A

Representative Photographs of the Study Area



Photo 1. Looking east across the northern portion of Nukoli'i Beach Park, depicting maintained grass (foreground), and park infrastructure. Lat/Long: 22.006695, -159.337396. Date: November 7, 2024.



Photo 2. Looking north into the Nukoli'i Beach Park parking lot depicting maintained beach park vegetation and park infrastructure. Lat/Long: 22.006043, -159.336764. Date: November 7, 2024.



Photo 3. Looking north along the shoreline of Nukoli'i Beach Park depicting coastal strand vegetation. Lat/Long: 22.006108, -159.336126. Date: November 7, 2024.



Photo 4. Looking west along Kaua'i Beach Road from the Nukoli'i Beach Park parking lot depicting landscaped areas with maintained grass in the right-of way. Lat/Long: 22.006079, -159.336928. Date: November 7, 2024.



Photo 5. Looking north along Kaua'i Beach Road, depicting maintained grassy areas in the right-of-way, and ironwood tree canopy overhanging the Study Area on the east (right) side of the road. Lat/Long: 22.006618, -159.339132. Date: November 7, 2024.



Photo 6. Looking south along Kaua'i Beach Road, depicting landscaped areas in the right-of-way. Lat/Long: 22.009166, - 159.340465. Date: November 7, 2024.



Photo 7. Looking northeast along Kaua'i Beach Drive, depicting landscaped areas with maintained lawns, groundcover, and trees within the Study Area. Lat/Long: 22.009312, -159.342311. Date: April 29, 2025.



Photo 8. Looking north along Kuhio Highway at the western boundary of the Nukoli'i portion of the Study Area, depicting maintained grass in the landscaped right-of-way. Lat/Long: 22.008096, -159.345611. Date: April 29, 2025.



Photo 9. Looking northeast along the northern boundary of the Kauai'i Community College portion of the Study Area, depicting maintained lawns and ornamental plantings, such as kukui trees. Lat/Long: 21.968867, -159.396286. Date: November 7, 2024.



Photo 10. Looking southeast along the eastern boundary of the Kauai'i Community College portion of the Study Area, depicting landscaped areas with maintained lawns and planted endangered loulu. Lat/Long: 21.969341, -159.395845. Date: November 7, 2024.



Photo 11. Looking southwest within the Kauai'i Community College portion of the Study Area, depicting maintained lawns and landscape plantings. Lat/Long: 21.968851, -159.395378. Date: November 7, 2024.



Photo 12. Looking southwest along the southern boundary of the Kauai'i Community College portion of the Study Area, depicting landscaped areas with maintained lawns and campus infrastructure. Lat/Long: 21.968564, -159.394855. Date: April 29, 2025.



Photo 13. Looking northwest along the northeastern boundary of the Kauai'i Community College portion of the Study Area, depicting landscaped areas with maintained lawns and campus infrastructure. Lat/Long: 21.968564, -159.394855. Date: April 29, 2025.



Photo 14. Looking west from Kaua'i Beach Road, depicting two adult Hawaiian common gallinules with juveniles in the ditch water immediately west of the Study Area. Lat/Long: 22.007875, -159.339846. Date: November 7, 2024.



Photo 15. Looking west from Kaua'i Beach Road immediately north of the Study Area, depicting endangered Hawaiian common gallinule in the adjacent ditch. Lat/Long: 22.010247, -159.341113. Date: April 29, 2025.



Photo 16. Looking northwest from the northern boundary of the Nukoli'i portion of the Study Area, depicting a family of four listed Hawaiian geese/ nēnē grazing along the ditch slope. Lat/Long: 22.01009, -159.341156. Date: April 29, 2025.

Hawaiian Islands Fiber Link Project – O‘ahu Cable Landing Site

Biological Resources Survey Report

Prepared for:
Ocean Networks, Inc. (ONI)

Revised August 2025

TETRA TECH

complex world | CLEAR SOLUTIONS™

Table of Contents

1.0 Introduction 1
1.1 Project Description 1
2.0 Description of the Study Area 2
2.1 Climate 2
2.2 Topography and Soils 2
2.3 Surface Waters 3
2.4 Critical Habitat for Listed Species 3
3.0 Methods 3
3.1 Plants 4
3.2 Wildlife 4
3.2.1 Birds 4
3.2.2 Terrestrial Mammals 4
3.2.3 Invertebrates 5
3.2.4 Sea Turtles and Marine Mammals 5
4.0 Results and Discussion 5
4.1 Plants 7
4.2 Wildlife 8
4.2.1 Birds 8
4.2.2 Terrestrial Mammals 10
4.2.3 Invertebrates 10
4.2.4 Sea Turtles and Marine Mammals 11
5.0 Conclusions and Recommendations 12
5.1 General 12
5.2 Plants 12
5.3 Wildlife 13
5.3.1 Listed Seabirds 13
5.3.2 Listed Waterbirds 13
5.3.3 Hawaiian Hoary Bat 13

5.3.4 Sea Turtles and Marine Mammals 14
6.0 References 14

List of Tables

Table 1. Federally or State-listed Species with the Potential to Occur in the Study Area 6
Table 2. Native Plant Species Recorded in the Study Area During the Surveys 7
Table 3. Bird Species Recorded in the Study Area and Immediate Vicinity 9
Table 4. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity 11

List of Figures

Figure 1. Project Overview
Figure 2. Project Study Area and Vicinity
Figure 3. Soils within the Study Area
Figure 4. Water Resources Mapped by NWI, NHD, and DAR
Figure 5. Critical Habitat Within the Study Area and Vicinity

List of Appendices

Appendix A. Representative Photographs of the Study Area

1.0 Introduction

The Hawaiian Islands Fiber Link (HIFL) Project is a proposed interisland submarine fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the State of Hawai'i. The Project would interconnect the six main Hawaiian Islands, with cable landing sites on Kaua'i , O'ahu, Maui, Lāna'i, Molokai, and Hawai'i Island.

Tetra Tech was contracted to conduct a general biological survey within the 5.5-acre (2.2 hectare [ha]) terrestrial study area for the O'ahu cable landing site. The purpose of the survey was to characterize the species and habitats present, and to determine whether state or federally-listed threatened or endangered species (pursuant to the federal Endangered Species Act or Hawai'i Revised Statutes [HRS] Chapter 195D) or otherwise rare plants or animals have the potential to occur and could be impacted by construction or operation of the Project. This report summarizes the results of the biological survey conducted within the Study Area by Tetra Tech on November 20, 2024.

1.1 Project Description

The HIFL Project involves construction, operation, and maintenance of an interisland fiber optic cable system that would interconnect the six main Hawaiian Islands to provide more robust, diverse and reliable broadband connectivity throughout the state. The fiber optic cable system would distribute high-speed broadband to each island, with cable landing sites strategically located on Kaua'i (Nukoli'i Beach), O'ahu (Barbers Point), Maui (Kahului), Lāna'i (Mānele Harbor), Molokai (Molokai Yacht Club), and Hawai'i Island (Hilo). The overall extent of the HIFL Project is shown in Figure 1.

The system would include both marine and terrestrial components, with the marine component comprising approximately 416 miles (669 kilometers [km]) of fiber optic cable surface-laid on the seabed between the islands. The cable would have a maximum diameter of approximately 1.1 inch (28 millimeters [mm]) and would be installed in five distinct segments spanning the nearshore state waters and surrounding U.S. federal waters.

At the O'ahu cable landing site, two subsurface boreholes would be installed using horizontal directional drilling (HDD) to allow the subsea fiber optic cable(s) to traverse from the nearshore waters under the shoreline to the terrestrial Study Area. One borehole would punchout in the ocean to the west for the cable connecting to Kaua'i and the other borehole would punchout in the ocean to the east for the cable connecting to Maui. The terrestrial components that would be constructed within the Study Area would include two beach manholes (BMH) and land-based cable (terrestrial cable). The BMHs would be below-ground reinforced concrete vaults (or similar) which would serve as the connection chamber between each subsea cable and terrestrial cable. From the BMHs, the terrestrial cable would be installed in an underground conduit to a manhole located next to an existing utility pole at the end of Olai Street. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, generally following a route along county and state roadways to DR Fortress in central Honolulu. Space within an existing building at DR Fortress would be used as the cable landing station

(CLS). The CLS would house cable operation and monitoring equipment and facilitate interconnection with the local telecommunications network. En route, the fiber optic cable would also connect to the UH West O'ahu campus, with space in an existing building used as a HIFL access point.[1,2]

2.0 Description of the Study Area

As shown in Figure 2, the Study Area is located within James Campbell Industrial Park in Kapolei on the south shore of the island of O'ahu. It encompasses 5.5 acres (2.2 ha), primarily within the Barbers Point Beach Park (tax map key (TMK) (1) 9-1-026:027 (por.), owned by the City and County of Honolulu) and a portion of the adjacent county roadway associated with Olai Street. The Study Area includes facilities and amenities associated with the City and County beach park (e.g., benches, showers, restrooms) as well as the cul-de-sac at the end of Olai Street. It is bordered on the north by Olai Street and industrial uses, on the east by a canal and industrial uses, on the west by Germaine's Luau, and on the south by the Pacific Ocean. Barbers Point Lighthouse is located approximately 0.1 mile (0.1 km) to the west, and Kalaeloa Airport is located approximately 1.5 miles (2.4 km) to the east.

2.1 Climate

The climate in the Study Area is characterized as arid (Price et al. 2012). The closest functioning National Weather Service (NWS) rainfall gauge to the Study Area (Kalaeloa Airport, located 2.4 miles [3.9 km] northeast of the Study Area) recorded below average rainfall in August, September, October, and November 2024 (NWS 2024a). The year-to-date total rainfall for this gauge through the end of November 2024 was 105% of average due to high rainfall in January and February (NWS 2024a). Moderate drought conditions were reported over leeward O'ahu during the survey period (NWS 2024b).

2.2 Topography and Soils

The majority of the Study Area is relatively flat with a maximum elevation of approximately 3 feet (1 meter [m]) above mean sea level. The topography changes gradually in the southern portion of the Study Area where a sandy beach slopes downward to meet the water's edge.

The Natural Resources Conservation Service (NRCS) identifies two soil types in the Study Area: Coral outcrop and Beaches (Figure 3; NRCS 2024). Coral outcrop is comprised of coral or cemented calcareous sand and sandy marine deposits characterized as excessively drained. Beaches are comprised of coarse sand characterized as excessively drained with very low runoff and frequent flooding (NRCS 2024).

[1] The segment of terrestrial fiber on the existing utility system is described herein to provide an overview of the entire system but is not further addressed by this study because it comprises existing third-party infrastructure.

[2] Existing buildings were not included in the Study Area for biological surveys because the Project would not involve any new infrastructure or associated ground disturbance in the buildings.

2.3 Surface Waters

The Study Area is situated within the Kaloi watershed which encompasses roughly 26 square miles (67 km^2) (CWRM 2019, CWRM 2022). Water resources identified by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data (USFWS 2024a) and the U.S. Geological Survey (USGS) topographic and National Hydrography Dataset (NHD; USGS 2023) are shown in Figure 4. NWI identifies estuarine and marine wetlands associated with the coastline along the southern portion of the Study Area (Figure 4). NWI also maps an estuarine and marine deepwater feature roughly 20 feet (6 m) east of and parallel to the eastern boundary of the Study Area. This feature is classified as a canal/ditch by NHD (USGS 2023). The feature continues north of the Study Area to Olai Street and splits east toward Hanua Street (Figure 4).

2.4 Critical Habitat for Listed Species

Designated marine and terrestrial critical habitat for the endangered Hawaiian monk seal/ ʻīlio-holo-i-ka-uaua (*Neomonachus schauinslandi*) occurs immediately south of the Study Area (Figure 5); this includes terrestrial habitat covering the area from the water's edge inland 16 feet (5 m) and marine habitat encompassing marine waters surrounding the island out to the 656-foot (200 m) depth contour line (NOAA 2015).

The National Oceanic and Atmospheric Administration (NOAA) has proposed marine critical habitat for the Central North Pacific distinct population segment of the threatened green sea turtle/ honu (*Chelonia mydas*) south of the Study Area (Figure 5). Proposed marine critical habitat includes all waters surrounding the island from the mean high water line to 65-foot (20 m) water depth (NOAA 2023a, NOAA 2023b). No proposed terrestrial critical habitat for the green sea turtle occurs within the Study Area or immediate vicinity (NOAA 2023a, USFWS 2023a).

No critical habitat for threatened or endangered plants has been designated by USFWS within the Study Area (USFWS 2024b). However, plant critical habitat Coastal—Unit 14 is located 80 feet (25 m) west of the Study Area (Figure 5). This unit was occupied by the endangered *Achyranthes splendens* var. *splendens* at the time of designation and is considered unoccupied critical habitat for an additional six listed plant species (USFWS 2012).

3.0 Methods

Prior to the field survey, Tetra Tech conducted a review of relevant publicly available literature and data with respect to biological resources in and near the Study Area. This review included environmental assessments and environmental impact statements, NWI and NHD data, scientific journals and reports, the USFWS Information for Planning and Consultation (IPaC) tool, and available, unpublished data that are relevant to the natural history and ecology of the area. In addition, Tetra Tech reviewed available geospatial data, aerial photographs, and topographic maps of the area to identify occurrences of state or federally-listed species, or habitats that could harbor these species. Tetra Tech biologists conducted

the biological field survey on November 20, 2024. Details regarding the field survey methodologies are provided below.

3.1 Plants

A pedestrian survey was conducted to identify and record common plant species and dominant vegetation types, as well as rare or listed plant species within the Study Area. Areas more likely to support native plants (e.g., rocky outcrops and shady areas) were more intensively examined. Plant identifications were made in the field; plants that could not be positively identified were photo-documented for comparison with the recent taxonomic literature.

Plants recorded during this survey are indicative of the season and environmental conditions at the time of the survey. The presence and location of plants can be influenced by seasonal and temporal changes; therefore, it is possible additional species may occur within the Study Area but were not present during this survey.

The taxonomy and nomenclature of plants are in accordance with Wagner et al. (2023). Common/ Hawaiian names are provided first, followed by scientific names in parentheses. If no common or Hawaiian name is known, only the scientific name is provided.

3.2 Wildlife

Wildlife surveys consisted of observations and identification of birds, terrestrial and marine mammals, and conspicuous invertebrate species encountered while searching the Study Area. Tetra Tech recorded all wildlife seen or heard while walking and driving within the Study Area coupled with visual observation of scat, tracks, and other animal sign. Habitats or plants that could support listed wildlife species were also identified if present (such as host plants for listed invertebrates or water features as potential habitat for listed Hawaiian waterbirds). Specific survey methods of each wildlife group are provided below.

3.2.1 Birds

All birds seen or heard while walking within the Study Area and vicinity were recorded. Habitats or plants that could support listed birds were also identified if present (e.g., water features as potential habitat for listed Hawaiian waterbirds). Scientific nomenclature for birds follows Birds of the World (Billerman et al. 2022).

3.2.2 Terrestrial Mammals

The terrestrial mammal survey was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign while walking within the Study Area. Scientific names for mammals follow Tomich (1986).

Ultrasonic bat detectors for the endangered Hawaiian hoary bat/ ʻōpeʻapeʻa (*Lasiurus semotus*) were not deployed as part of the survey. Rather, as USFWS and State of Hawaiʻi Division of Forestry and Wildlife (DOFAW) recognize all woody vegetation greater than 15 feet (4.6 m) tall as potential bat

roosting habitat (DOFAW 2015, USFWS 2023b), the presence/absence of suitable bat foraging and roosting habitat within the Study Area was noted.

3.2.3 Invertebrates

Observations of large and conspicuous insects and invertebrates were recorded incidentally while walking through the Study Area. Invertebrates were identified through visual observations and were not collected as specimens in the field. Scientific nomenclature for terrestrial invertebrates follows Nishida (2002), and WoRMS Editorial Board (2024) for marine invertebrates.

3.2.4 Sea Turtles and Marine Mammals

This survey focused on characterizing the nearshore marine and shoreline habitat for listed sea turtles and protected marine mammals (e.g., monk seals) and was limited to visual observations from the shoreline using binoculars. Biologists scanned the near-shore marine waters and suitable nearshore terrestrial habitat for individuals or their potential habitat.

4.0 Results and Discussion

The biological resources in the Study Area have been highly modified by historic land uses and the introduction of invasive species, which has reduced the number and abundance of native species and habitats suitable for native species. Most of the Study Area has been developed as a recreational beach park and includes infrastructure such as paved roads and pathways, vehicle parking areas, restroom facilities, and picnic tables. Representative photographs from the survey are presented in Appendix A.

No federally or state-listed species were observed within the Study Area during the survey. Although not observed in the Study Area, several listed animal species (including listed seabirds, listed waterbirds, Hawaiian hoary bats, and Hawaiian monk seals) may occassionally occur in or traverse the Study Area. Listed species with the potential to occur in the Study Area are summarized in Table 1 and discussed in further detail below.

Table 1. Federally or State-listed Species with the Potential to Occur in the Study Area

Common/Hawaiian Name(s)	Scientific Name	Listing Status[1]	Critical Habitat in Study Area	Potential Occurrence in Study Area
Birds				
Hawaiian common gallinule/ ʻalae ʻula	*Gallinula galeata sandvicensis*	SE, FE	None Designated	Preferred habitat not present, but could occasionally use adjacent canal, or fly over.
Hawaiian coot/ ʻalae keʻo keʻo	*Fulica alai*	SE, FE	None Designated	Preferred habitat not present, but could occasionally use adjacent canal, or fly over.
Hawaiian stilt/ aeʻo	*Himantopus mexicanus knudseni*	SE, FE	None Designated	Preferred habitat not present, but could occasionally use grassy lawn, adjacent canal, or fly over.
Hawaiian short-eared owl/ pueo	*Asio flammeus sandwichensis*	SE	None Designated	Could occasionally forage in Study Area, but occurrence likely transient due to lack of suitable nesting habitat and high human activity.
Hawaiian petrel/ ʻuaʻu	*Pterodroma sandwichensis*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Newell's shearwater/ ʻaʻo	*Puffinus auricularis newelli*	ST, FT	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (March and December).
Band-rumped storm-petrel/ ʻakēʻakē	*Hydrobates castro*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (March and December).
Terrestrial Mammals				
Hawaiian hoary bat/ ʻōpeʻapeʻa	*Lasiurus semotus*	SE, FE	None Designated	Could traverse or forage in the Study Area or roost in vegetation > 15 feet in height.
Sea Turtles and Marine Mammals				
Green sea turtle/ honu	*Chelonia mydas*	ST, FT	Proposed marine immediately south	Not known to nest near the Study Area, but could forage offshore.
Hawaiian monk seal/ ʻīlio-holo-i-kauaua	*Neomonachus schauinslandi*	SE, FE	Designated marine and terrestrial immediately south	Could haul out on sandy shoreline along the southern boundary of the Study Area.

1. FE = Federally endangered; SE = State endangered; FT = Federally threatened; ST = State threatened.

4.1 Plants

No federal or state-listed threatened, endangered, proposed listed, or candidate plant species were observed in the Study Area during the biological survey. The Study Area is dominated by non-native plants. Nine native plant species were observed in the Study Area (Table 2). None of the native plant species are considered rare (Wagner et al. 2023), and most are common throughout the Hawaiian Islands.

Table 2. Native Plant Species Recorded in the Study Area During the Surveys

Common/Hawaiian Name	Scientific Name	Status
ʻakiʻaki	*Sporobolus virginicus*	I
ʻākulikuli	*Sesuvium portulacastrum*	I
kīpukai	*Heliotropium curassavicum*	I
milo	*Thespesia populnea*	I
naio	*Myoporum sandwicense* subsp. *sandwicense*	E
naupaka kahakai	*Scaevola taccada* var. *taccada*	I
pāʻū o Hiʻiaka	*Jacquemontia sandwicensis*	I
pōhuehue	*Ipomoea pes-caprae* subsp. *brasiliensis*	I
ʻuhaloa	*Waltheria indica*	I
Status: E = Endemic (native only to the Hawaiian Islands); I = Indigenous (native to the Hawaiian Islands and elsewhere).		

Vegetation in the Study Area is characterized by two vegetation types: Maintained Beach Park Vegetation and Coastal Strand. These are described in more detail below.

Maintained Beach Park Vegetation: This vegetation type occurs in the majority of the Study Area and is comprised of mowed grassy areas mixed with non-native naturalized and planted ornamental species. The mowed grassy areas are dominated by Bermuda grass (*Cynodon dactylon*) and buffel grass (*Cenchrus ciliaris*) into which various weedy species have intruded (Appendix A, Photos 1 – 3). Weedy species growing among and along the disturbed edges include *Bothriochloa pertusa*, Guinea grass (*Megathyrsus maximus*), wiregrass (*Eleusine indica*), swollen fingergrass (*Chloris barbata*), khaki weed (*Alternanthera pungens*), Australian saltbush (*Atriplex semibaccata*), saltbush (*Atriplex suberecta*), *Euploca procumbens*, scarlet boerhavia (*Boerhavia coccinea*), coat buttons (*Tridax procumbens*), red-flowered sida (*Sida ciliaris*), *Calyptocarpus vialis*, *Sesuvium verrucosum*, wedelia (*Sphagneticola trilobata*), false mallow (*Malvastrum coromandelium*), obscure morning glory (*Ipomoea obscura*), beggartick (*Bidens alba* var. *radiata*), slender mimosa (*Desmanthus pernambucanus*), Indian pluchea (*Pluchea indica*), and marsh fleabane (*Pluchea* x*fosbergii*).

Multiple coconut palm trees (*Cocos nucifera*) are planted within the maintained vegetation (Appendix A, Photo 4), as well as several scattered false kamani (*Terminalia catappa*), shower tree (*Cassia* sp.), and kiawe (*Neltuma pallida*). Trees within this vegetation type reach heights up to 35 feet (10 m). Patches of the native pā'ū o Hi'iaka (*Jacquemontia sandwicensis*) are present in the grassy areas (Appendix A, Photo 5). Other native species scattered within this vegetation type include individuals of kīpukai (*Heliotropium curassavicum*), 'ākulikuli (*Sesuvium portulacastrum*), milo (*Thespesia populnea*), and uhaloa (*Waltheria indica*). A few naio (*Myoropum sandwicense* subsp. *sandwicense*) individuals occur along the western boundary.

Coastal Strand: This vegetation type occurs as a relatively narrow band in the southern portion of the Study Area between the interface of the maintained vegetation and the beach. This vegetation type is dominated by the native naupaka kahakai (*Scaevola taccada* var. *taccada*) and pōhuehue (*Ipomoea pes-caprae* subsp. *brasiliensis*) (Appendix A, Photos 6 – 7). Non-native plants occurring as scattered individuals in this vegetation type include *Sesuvium verrucosum*, red-flowered sida, Indian pluchea, low-statured kiawe, and coconut palm. Additional native species present in this vegetation type include 'aki'aki (*Sporobolus virginicus*), pā'ū o Hi'iaka, kīpukai, and 'ākulikuli.

4.2 Wildlife

4.2.1 Birds

Fifteen bird species were recorded in the Study Area and immediate vicinity during the survey (Table 3). All of these bird species are either non-native or migrants to the Hawaiian Islands and are species commonly found on O'ahu. The most common bird species recorded during the survey were common waxbill (*Estrilda astrild*), common myna (*Acridotheres tristis*), and African silverbill (*Euodice cantans*). Three native shorebird migrants were recorded—Pacific golden-plover/ kōlea (*Pluvialis fulva*), ruddy turnstone/ 'akekeke (*Arenaria interpres*), and wandering tattler/ 'ūlili (*Tringa incana*); these species are also protected by the Migratory Bird Treaty Act (Table 3). Although no federal or state-listed birds species were recorded during the survey, several listed bird species have the potential to occasionally be present in or traverse the Study Area, as discussed below.

Table 3. Bird Species Recorded in the Study Area and Immediate Vicinity

Common/Hawaiian Name	Scientific Name	Status
African silverbill	*Euodice cantans*	NN
Common myna	*Acridotheres tristis*	NN
Common waxbill	*Estrilda astrild*	NN
House finch	*Haemorhous mexicanus*[1]	NN
House sparrow	*Passer domesticus*	NN
Pacific golden-plover/ kōlea	*Pluvialis fulva*[1]	M
Red-crested cardinal	*Paroaria coronata*	NN
Red-vented bulbul	*Pycnonotus cafer*	NN
Rock pigeon	*Columba livia*	NN
Ruddy turnstone/ 'akekeke	*Arenaria interpres*[1]	M
Saffron finch	*Sicalis flaveola*	NN
Spotted dove	*Spilopelia chinensis*	NN
Wandering tattler/ 'ūlili	*Tringa incana*[1]	M
Warbling white-eye	*Zosterops japonicus*	NN
Zebra dove	*Geopelia striata*	NN

Status: M = Migrant, NN = Non-native established species.

1. Protected by the Migratory Bird Treaty Act (MBTA).

Listed Waterbirds: The endangered Hawaiian stilt/ ae'o (*Himantopus mexicanus knudseni*), Hawaiian coot/ 'alae ke'oke'o (*Fulica alai*), and Hawaiian common gallinule/ 'alae 'ula (*Gallinula galeata sandvicensis*), collectively referred to as listed waterbirds, were not observed during the survey. Their preferred habitats (e.g., wetlands, streams, ponds, mudflats, reservoirs) are not present within the Study Area; however, listed waterbirds could occasionally use the surface water in the canal/ditch located just east of the Study Area. Listed waterbirds could also fly over or near the Study Area while traveling between suitable habitat outside of the Study Area. Listed waterbirds are known to utilize nearby areas including a coastal wetland located 0.4 miles (0.7 km) to the east (Tetra Tech, unpubl.), Ko'olina Golf Course located 2.7 miles (4.3 km) to the north, and Ordy Pond located 3.4 miles (5.4 km) to the northeast (eBird 2021).

Hawaiian Short-eared Owl/Pueo: The Hawaiian short-eared owl/pueo (*Asio flammeus sandwichensis*) is a culturally significant endemic subspecies of the widespread short-eared owl (*Asio flammeus*). The State of Hawai'i lists pueo as endangered on O'ahu. Pueo were not seen in the Study Area; however, evening or early morning surveys were not conducted. Pueo have been observed in the general vicinity around Kapolei (Price and Cotín 2017, eBird 2021), and suitable hunting, roosting, and nesting habitat is present along the leeward coast. Nesting pueo have been documented to the north of the Study Area in

Lualualei valley (NAVFAC 2023). Given their occurrence in the vicinity and that pueo use a variety of habitats, it is possible pueo could traverse or occasionally forage in the Study Area, but it is unlikely pueo would nest within the Study Area given the lack of suitable nesting habitat and human presence.

Listed Seabirds: The endangered Hawaiian petrel/ 'ua'u (*Pterodroma sandwichensis*), threatened Newell's shearwater/ 'a'o (*Puffinus newelli*), and endangered band-rumped storm-petrel/ 'akē'akē (*Hydrobates castro*) (collectively referred to as listed seabirds) have not been documented in the Study Area, and suitable nesting habitat does not occur in the Study Area. However, these birds have the potential to fly over the Study Area at night between March and December while transiting between nest sites in upper elevations of the island and the ocean. These listed seabirds are known to be attracted to outdoor lighting at night; after circling the lights, they can become exhausted and collide with nearby structures or fall to the ground (USFWS 2023b).

4.2.2 Terrestrial Mammals

Two non-native terrestrial mammalian species were detected in the area during the survey. A feral cat (*Felis catus*) and an off-leash dog (*Canis familiaris*) were observed in the Study Area. Rats (*Rattus* spp.), small Indian mongoose (*Herpestes auropunctatus*), and house mice (*Mus musculus*) are also likely to occur within the Study Area, but were not observed during the survey.

Recent studies have found that Hawai'i's only native, extant terrestrial mammal—the endangered Hawaiian hoary bat—is more abundant across the Hawaiian Islands than previously understood (Gorresen et al. 2013, Bonaccorso et al. 2015, USGS 2019). This species will forage in open and semi-cluttered landscapes in a wide range of habitats and vegetation types, such as in open areas, at forest edges or within gaps, and over open water bodies including streams, ponds, and along shorelines (Jacobs 1994, Jacobs 1999, Bonaccorso et al. 2015, Pinzari et al. 2019). Hawaiian hoary bats are tree-roosting bats and roost in various native and non-native trees (USFWS 1998, Gorresen et al. 2013, Montoya-Aiona et al. 2023). Coconut palms, false kamani, and kiawe trees within the Study Area are over 15 feet (4.6 m) tall and have the potential to function as bat roost trees (DOFAW 2015, USFWS 2023b). Thus, Hawaiian hoary bats may transit, roost, or forage in portions of the Study Area.

4.2.3 Invertebrates

Large and conspicuous invertebrates incidentally recorded during the survey are listed in Table 4. Along the shoreline, two native marine invertebrate taxa were observed—the indigenous 'a'ama crab (*Grapsus tenuicrustatus*) and horned ghost crab (*Ocypode ceratophthalma*). Two native dragonfly species, the globe skimmer (*Pantala flavescens*) and green darner (*Anax junis*), were also recorded. Damage from the invasive coconut rhinoceros beetle (*Oryctes rhinoceros*) was observed on two coconut palms within the Study Area; this species is now widespread on O'ahu (CRBRH 2024).

Table 4. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity

Common/Hawaiian Name	Scientific Name	Status
'A'ama crab	*Grapsus tenuicrustatus*	I
Coconut rhinoceros beetle	*Oryctes rhinoceros*	NN
Dog dung fly	*Musca sorbens*	NN
Grasshopper	Acrididae*	NN
Globe skimmer	*Pantala flavescens*	I
Green darner	*Anax junius*	I
Horned ghost crab	*Ocypode ceratophthalma*	I
Large orange sulphur	*Phoebis agarithe*	NN
Rambur's forktail	*Ischnura ramburii*	NN
Seven-spot lady beetle	*Coccinella septempunctata*	NN
Typical jumping spider	Salticidae*	NN
Wasp	Vespidae*	NN
Western pygmy blue	*Brephidium exilis*	NN

Status: I = Indigenous, NN = non-native species.

* Represents family because lower taxonomic identification could not be made in the field.

4.2.4 Sea Turtles and Marine Mammals

No sea turtles, monk seals, or other marine mammals were recorded in the Study Area during the survey. However, the shoreline and nearshore marine area adjacent to the Study Area contains critical habitat for the Hawaiian monk seal and green sea turtle (see Section 2.4). Hawaiian monk seals spend most of their time in the ocean, but also haul out on land for resting, pupping, nursing, molting, and avoiding predators. They primarily haul out on sandy beaches, but also utilize coral rubble, rocky and volcanic substrates (NMFS 2007, NOAA 2011). The shoreline in the vicinity of the Study Area is noted by NOAA as a haul out area for Hawaiian monk seals (NOAA 2014). Monk seals have been occasionally documented on nearby Nimitz Beach, located 2 miles (3.2 km) to the east (NAVFAC 2023).

In Hawai'i, green sea turtles mostly nest on sandy beaches close to where they hatched (NOAA 2023b). The species is not known to nest in the Study Area or immediate vicinity; the closest known nesting site is at Lanikūhonua Beach (approximately 3.4 miles [5.5 km] northwest of the Study Area) (NOAA 2023a, NOAA 2023b, USFWS 2023a). Green sea turtles often forage in shallow reefs throughout the main Hawaiian Islands where their food source is plentiful (Balazs et al. 1987). Sea turtle food resources (e.g., macroalgae, seagrass) could be seen in the marine environment near the Study Area; therefore, it is possible green sea turtles could forage offshore of the Study Area.

The endangered hawksbill sea turtle (*Eretmochelys imbricata*) is a rare species of sea turtle that uses similar feeding grounds to the green sea turtle (Gaos et al. 2020) and nests on a wide range of substrates (USFWS 2023b). There is a lack of available information on the nesting and foraging locations for this species; however, based on the possible presence of food resources in the nearby marine environment, hawksbill sea turtles have the potential to forage on the nearshore reef in the vicinity of the Study Area.

5.0 Conclusions and Recommendations

As described in Section 4, many of the plants and animals observed in the Study Area are non-native to the Hawaiian Islands. No federal and state listed species were observed within the Study Area during the biological survey. Although not observed, several listed wildlife species have the potential to occur in or transit through the Study Area, such as listed seabirds, listed waterbirds, Hawaiian hoary bats, and Hawaiian monk seals. Recommended measures to avoid and minimize impacts to these species are outlined below.

5.1 General

In addition to the species-specific measures detailed below, Tetra Tech recommends the following general measures to avoid and minimize impacts to biological resources:

- Although non-native weedy species are common in the Study Area, invasive species minimization measures should be implemented to avoid unintentional introduction or transport of new invasive species to the area. This includes utilizing on-site gravel, rock, and soil (or purchasing from a local supplier) when practicable; utilizing certified, weed-free seed mixes; and washing construction equipment and/or visually inspecting equipment for excessive debris, plant materials, and invasive or harmful non-native species as appropriate.
- Staff should be trained to identify listed wildlife or MBTA-protected birds that may be found on-site (e.g., listed waterbird) and to take appropriate steps if listed wildlife species are found.
- If downed listed wildlife species are observed at the Project, notify USFWS and DOFAW as soon as possible.

5.2 Plants

No listed or rare plant species were observed during the survey. Overall, the vegetation in the Study Area is disturbed from previous land use activities and non-native invasive plants dominate. The nine native plant species recorded within the Study Area commonly occur throughout the Hawaiian Islands. Tetra Tech recommends the following with regards to plants:

- If landscaping is installed as part of the Project, use non-invasive plants and incorporate native plant species to the maximum extent practicable.
- Avoid removing the native plants in the coastal strand vegetation along the shoreline (e.g., naupaka kahakai, pōhuehue, 'aki'aki) to the maximum extent practicable.

5.3 Wildlife

Nearly all the animal species recorded in the Study Area are not native to the Hawaiian Islands. Only three native bird species and four native invertebrates species were recorded within the Study Area and vicinity. Habitat present in the Study Area is generally not suitable for listed wildlife. However, several listed animal species have the potential to occasionally occur in or transit the Study Area.

5.3.1 Listed Seabirds

The Study Area does not provide suitable nesting or foraging habitat for the three listed seabirds. However, individuals may fly over the area during the breeding, nesting, and fledging seasons (March 1 - December 15) and may be attracted to nighttime lighting. Disorientation and fallout as a result of light attraction could occur for individuals attracted to unshielded nighttime lighting. Juvenile birds are particularly vulnerable to light attraction, and grounded birds are vulnerable to mammalian predators or vehicle strikes (Rodríguez et al. 2017). Tetra Tech recommends the following measures to avoid and minimize potential impacts to listed seabirds:

- If operational on-site lighting is required, it should consist of fixtures that will be shielded and/or directed downward to prevent upward radiation, triggered by a motion detector, and fitted with non-white light bulbs to the extent possible.
- Avoid the use of nighttime lighting that could attract seabirds during the seabird peak fallout period (September 15 - December 15).
- If a grounded seabird is found at the Project, contact USFWS and DOFAW immediately. These agencies may recommend contacting a wildlife rehabilitation facility such as Feather and Fur Animal Hospital at (808) 254-1548.
- Minimize construction of overhead lines to reduce potential collision risk for seabird species.

5.3.2 Listed Waterbirds

No listed waterbirds were detected during the surveys. However, the canal/ditch immediately east of the Study Area could function as low-quality suitable waterbird habitat, and listed waterbirds have been recorded in the vicinity. To avoid impacts to listed waterbirds during Project construction and operation, Tetra Tech recommends the following based on avoidance and minimization measures provided by USFWS (2023b):

- Avoid creating areas with standing water.
- If listed waterbirds are found in the Study Area during active construction, cease all activities within 100 feet (30 m) of the bird(s), and do not approach the bird(s). Work may continue after the listed waterbird leaves the area of its own accord.

5.3.3 Hawaiian Hoary Bat

Direct impacts to bats could occur if roost trees are disturbed or through the use of barbed wire. Tetra Tech recommends the following avoidance measures provided by USFWS (2023b):

- To prevent entanglement, do not use barbed wire for fencing.
- Do not trim, disturb, or remove woody vegetation taller than 15 feet (4.6 m) between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

5.3.4 Sea Turtles and Marine Mammals

No sea turtles or marine mammals were detected within the Study Area during the surveys, but suitable habitat for monk seals is present along the coast, and green and hawksbill sea turtles have the potential to forage in the nearshore waters. Tetra Tech recommends following the Standard Local Operating Procedures for Endangered Species in the Central and Western Pacific Region (Pac-SLOPES) provided by U.S. Army Corps of Engineers (USACE 2022) to minimize impacts to ESA-listed marine species (sea turtles, marine mammals, sharks, rays) and their habitats. Tetra Tech also recommends the following avoidance measures adapted from USFWS (2023b):

- Do not use vehicles on or modify the beach area during the sea turtle nesting or hatching season (May through December).
- Have a biologist (or qualified, trained individual) familiar with sea turtles and monk seals conduct a visual survey of the project site immediately prior to work to ensure no sea turtles or monk seals are present. If these species are found within the project area, cease all mechanical or construction activities within 100 feet (30 m) until the animal voluntarily leaves the area.
- Remove any project-related debris, trash, or equipment from the beach/shoreline if not actively being used.
- Do not stockpile project-related materials in the intertidal zone, reef flats, sandy beach, and adjacent vegetated areas.
- Incorporate applicable USFWS best management practices regarding Work in Aquatic Environments (USFWS 2022).
- Avoid nighttime work during the nesting (May-September) and hatching season (November-December) of sea turtles.
- Minimize the use of lighting on or near beaches and shield all project-related lights so the light is not visible from the beach/shoreline.
- Incorporate design measures into the construction or operation of buildings adjacent to the beach/shoreline to reduce ambient outdoor lighting.

6.0 References

Balazs, G.H., R.G. Forsyth, and A.K.H. Kam. 1987. Preliminary Assessment of Habitat Utilization by Hawaiian Green Turtles in their Resident Foraging Pastures. National Oceanic and Atmospheric Administration. NOAA Technical Memorandum Series NOAA-TM-NMFS-SWFC; 71. Accessed November 2024. https://repository.library.noaa.gov/view/noaa/5758.

Billerman, S.M., B.K. Keeney, P.G. Rodewald, and T.S. Schulenberg (Editors). 2022. Birds of the World. Cornell Laboratory of Ornithology, Ithaca, NY, USA. Accessed November 2024. https://birdsoftheworld.org/bow/home.

Bonaccorso, F.J., C.M. Todd, A.C. Miles, and P.M. Gorresen. 2015. Foraging Range Movements of the Endangered Hawaiian Hoary Bat, *Lasiurus cinereus semotus*. Journal of Mammalogy 96(1):64-71.

Coconut Rhinoceros Beetle Response – Hawai'i (CRBRH). 2024. Coconut Rhinoceros Beetle Response. Accessed November 2024. https://www.crbhawaii.org/.

CWRM (State of Hawaii, Department of Land and Natural Resources: Commission on Water Resource Management). 2019. Water Resource Protection Plan. Prepared by Townscape, Inc. Accessed November 2024. https://files.hawaii.gov/dlnr/cwrm/planning/wrpp2019update/WRPP_ALL_201907.pdf.

CWRM. 2022. Surface water hydrologic unit boundaries for the 8 major Hawaiian Islands as of August 2022. Layer Name: Watersheds (CWRM). Accessed November 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::watersheds/explore?location=19.907608%2C-155.475058%2C8.18.

DAR (State of Hawai'i Division of Aquatic Resources). 2008. Streams (both perennial and non-perennial). Accessed November 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::streams/about.

DOFAW (State of Hawai'i, Department of Land and Natural Resources: Division of Forestry and Wildlife). 2015. Endangered Species Recovery Committee Hawaiian Hoary Bat Guidance Document.

eBird. 2021. eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York. Accessed September 2024. http://www.ebird.org.

Gaos, A.R., E.L. LaCasella, L. Kurpita, G. Balazs, S. Hargrove, C. King, H. Bernard, T.T. Jones, and P.H. Dutton. 2020. Hawaiian Hawksbills: A Distinct and Isolated Nesting Colony in the Central North Pacific Ocean Revealed by Mitochondrial DNA. Conservation Genetics, 21: 771–783. https://doi.org/10.1007/s10592-020-01287-1.

Gorresen, P.M., F.J. Bonaccorso, C.A. Pinzari, C.M. Todd, K. Montoya-Aiona, and K. Brinck. 2013. A five-year study of Hawaiian hoary bat (*Lasiurus cinereus semotus*) occupancy on the island of Hawai'i. Technical Report HCSU-041. Hawai'i Cooperative Studies Unit, University of Hawai'i at Hilo, Hilo, HI. July 2013.

Jacobs, D.S. 1994. Distribution and abundance of the endangered Hawaiian hoary bat, *Lasiurus cinereus semotus*, on the island of Hawai'i. Pacific Science. 48(2): 193-200.

Jacobs, D.S. 1999. The diet of the insectivorous Hawaiian hoary bat (*Lasiurus cinereus semotus*) in an open and a cluttered habitat. Canadian Journal of Zoology. 77: 1603-1608. 10.1139/z99-110.Magnacca, K.N., and C. King. 2013. Assessing the presence and distribution of 23 Hawaiian yellow-faced bee species on lands adjacent to military installations on O'ahu and Hawai'i Island. Pacific Cooperative Studies Unit, University of Hawai'i at Mānoa. Technical Report 185.

Montoya-Aiona, K., P.M. Gorresen, K.N. Courtot, A. Aguirre, F. Calderon, S. Casler, S. Ciarrachi, J. Hoeh, J.L. Tupu, and T. Zinn. 2023. Multi-scale assessment of roost selection by 'ōpe'ape'a, the Hawaiian hoary bat (*Lasiurus semotus*). Plos one, 18(8): e0288280.

NAVFAC (Naval Facilities Engineering Systems Command). 2023. Draft Integrated Natural Resources Management Plan for Joint Base Pearl Harbor-Hickam, O'ahu. November 2023. Prepared for Naval Facilities Engineering Systems Command, Hawai'i.

NMFS (National Marine Fisheries Service). 2007. Recovery plan for the Hawaiian monk seal (*Monachus schauinslandi*), Revision. https://repository.library.noaa.gov/view/noaa/3521.

NOAA (National Oceanic and Atmospheric Administration). 2011. Endangered and Threatened Wildlife and Plants: Proposed Rulemaking to Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 76 (106): 32026 –32063.

NOAA. 2015. Endangered and Threatened Wildlife and Plants: Final Rulemaking To Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 80 (162): 50926–50988.

NOAA. 2023a. National ESA Critical Habitat Mapper (v1.0) by the National Marine Fisheries Service. Accessed November 2024. https://www.fisheries.noaa.gov/resource/map/national-esa-critical-habitat-mapper.

NOAA. 2023b. Endangered and Threatened Wildlife and Plants: Proposed Rule To Designate Marine Critical Habitat for Six Distinct Population Segments of Green Sea Turtles. Federal Register. 88(137): 46572–46671.

NRCS (Natural Resources Conservation Service). 2024. Web Soil Survey. Accessed November 2024. http://websoilsurvey.nrcs.usda.gov/.

NWS (National Weather Service). 2024a. Precipitation Summaries. Accessed December 2024. https://www.weather.gov/hfo/hydro_summary.

NWS. 2024b. Drought Information Statement For the Main Hawaiian Islands Valid November 15, 2024. Accessed November 2024. https://www.weather.gov/hfo/DroughtInformationStatement.

Nishida, G. 2002. Hawaiian Terrestrial Arthropod Checklist. 4th Edition. Hawai'i Biological Survey Bishop Museum.

Pinzari, C., R. Peck, T. Zinn, D. Gross, K. Montoya-Aiona, K. Brinck, M. Gorressen, and F. Bonaccorso. 2019. Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) activity, diet and prey availability at the Waihou Mitigation Area, Maui. Technical Report HCSU-090. Hawai'i Cooperative Studies Unit, University of Hawai'i at Hilo, Hilo, Hawai'i. June 2019.

Price, J. P., J. Jacobi, D., S.M. Gon (III), D. Matsuwaki, L. Mehrhoff, W. Wagner, M. Lucas, and B. Rowe. 2012. Mapping plant species ranges in the Hawai'ian Islands—Developing a methodology and associated GIS layers. U.S. Geological Survey Open-File Report 2012–1192, 34 p., one appendix (species table), 1,158 maps. http://pubs.usgs.gov/of/2012/1192/.

Price, M. and J. Cotín. 2017. Population size, distribution, and habitat use of the Hawaiian short-eared owl (*Asio flammeus sandwichensis*) on O'ahu. Accessed July 2024. https://dlnr.hawaii.gov/wp-content/uploads/2017/10/FW18-Pueo-Rpt.pdf.

Rodríguez, A., N.D. Holmes, P.G. Ryan, K.-J. Wilson, L. Faulquier, Y. Murillo, A.F. Raine, J.F. Penniman, V. Neves, B. Rodríguez, J.J Negro, A. Chiaradia, P. Dann, T. Anderson, B. Metzger, M. Shirai, L. Deppe, J. Wheeler, P. Hodum, C. Gouveia, V. Carmo, G.P. Carreira, L. Delgado-Alburqueque, C. Guerra-Correa, F.-X. Couzi, M. Travers and M.L. Corre. 2017. Seabird mortality induced by land-based artificial lights. Conservation Biology, 31: 986-1001.

Tomich, P.Q. 1986. Mammals in Hawaii. Bishop Museum Press, Honolulu, HI. 375 pp.

USACE (U.S. Army Corps of Engineers). 2022. Pac-Slopes BMPS. Revised: 02 March 2022. Provided to Tetra Tech by USACE on March 6, 2023.

USFWS (U.S. Fish and Wildlife Service). 1998. Recovery Plan for the Hawaiian hoary bat (*Lasiurus cinereus semotus*). U.S. Fish and Wildlife Service, Portland, OR.

USFWS. 2012. Endangered and Threatened Wildlife and Plants; Endangered Status for 23 Species on Oahu and Designation of Critical Habitat for 124 Species; Final Rule. Federal Register 77 (181): 57648-57862.

USFWS. 2022. Best Management Practices for Work in or Around Aquatic Environments. Accessed November 2024. https://www.fws.gov/sites/default/files/documents/Best%20Management%20Practices%20For%20Work%20In%20or%20Around%20Aquatic%20Environment-April%202022.pdf.

USFWS. 2023a. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Green Sea Turtle. Federal Register. 88 (137): 46376- 46570.

USFWS. 2023b. Animal Avoidance and Minimization Measures. Accessed November 2024. https://www.fws.gov/sites/default/files/documents/Animal Avoidance and Minimization Measures - FINAL May 2023_0.pdf.

USFWS. 2024a. National Wetlands Inventory. Wetlands Data by State, Hawai'i. Accessed November 2024. https://www.fws.gov/node/264847.

USFWS. 2024b. Critical Habitat - Polygon Features – Final. Accessed November 2024. https://www.arcgis.com/apps/mapviewer/index.html?url=https://services.arcgis.com/QVENGdaPbd4LUkLV/ArcGIS/rest/services/USFWS_Critical_Habitat/FeatureServer&source=sd.

USGS (U.S. Geologic Survey). 2019. Ecology and Distribution of the Endangered Hawaiian Hoary Bat. Accessed November 2024. https://www.usgs.gov/pacific-island-ecosystems-research-center/science/ecology-and-distribution-endangered-hawaiian#:~:text=Distribution%20and%20seasonal%20altitudinal%20migration,appears%20to%20occur%20was%20documented.

USGS. 2023. National Hydrography Dataset. Accessed November 2024. https://www.usgs.gov/national-hydrography/access-national-hydrography-products.

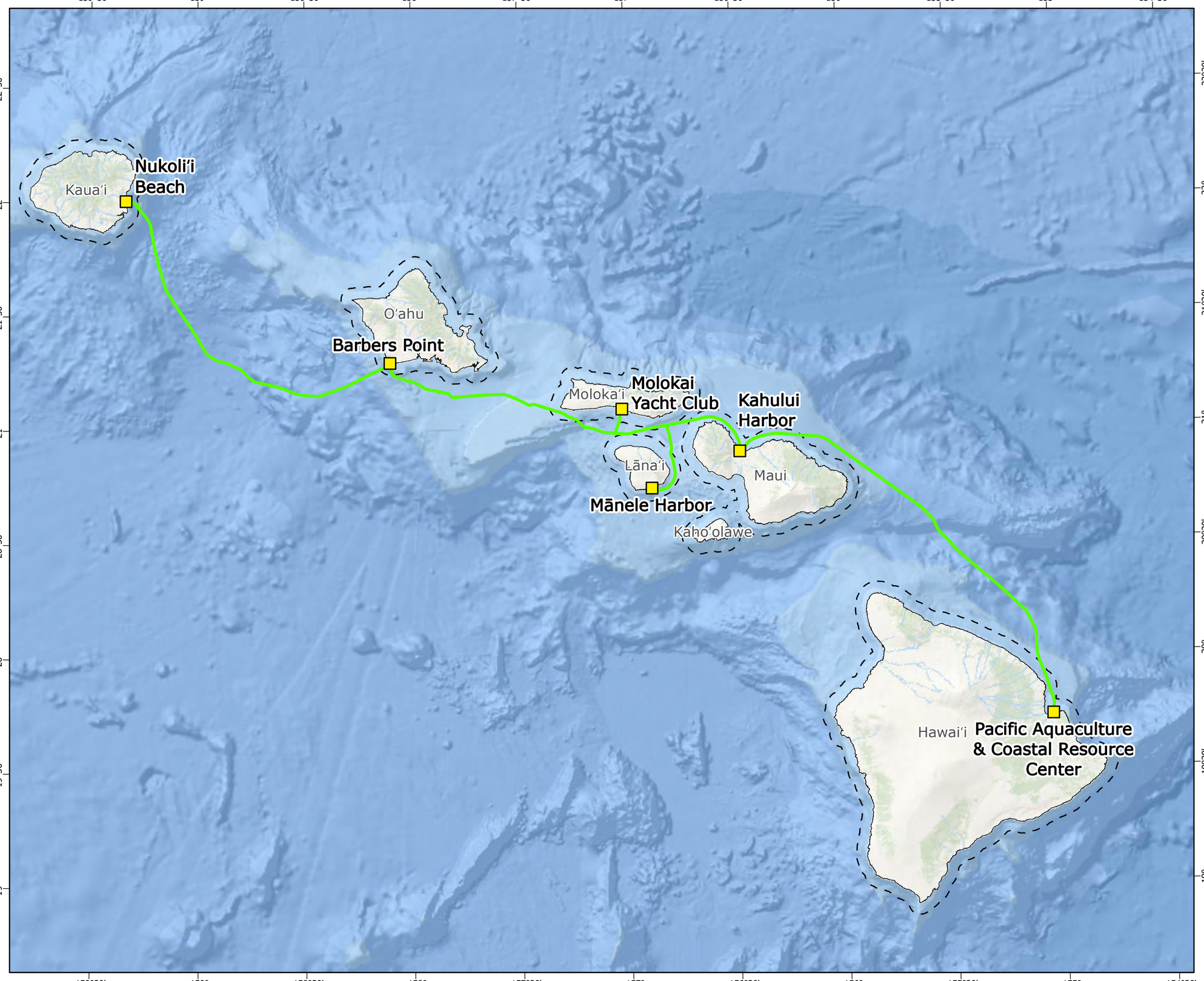
Wagner, W.L., D.R. Herbst, and D.H. Lorence. 2023. Flora of the Hawaiian Islands website. Accessed November 2024. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm.

WoRMS (World Register of Marine Species) Editorial Board. 2024. Accessed November 2024. https://www.marinespecies.org/aphia.php?p=search.

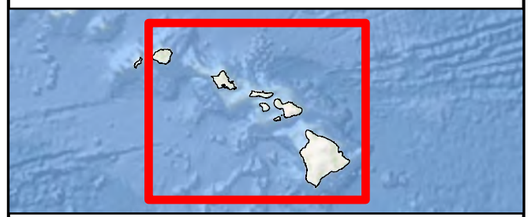
Figures

Hawaiian Islands Fiber Link

Figure 1
Project Overview



- Subsea Cable
- Cable Landing Site
- State Waters Limits (3 nautical miles)



0 20 40 80 120
Kilometers

0 10 20 40
Nautical Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\ProjectOverview_20240514\ONI_HIFL_ProjectOverview_20240801.aprx

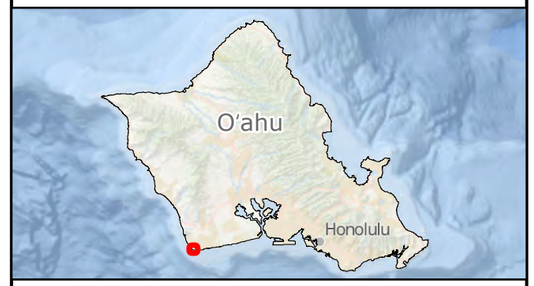
Hawaiian Islands Fiber Link Project - Barbers Point Cable Landing Site

Figure 2
Project Study Area and Vicinity

Study Area
TMK Parcel
Roads

Olai St
Barbers Point Beach Park
(1)9-1-026:027
Germaine's Luau

The study area boundaries were developed using professional survey data to ensure proper alignment with the legal lot boundaries, where applicable. The publicly available TMK dataset is provided for context, but has varying spatial accuracy standards and may not perfectly match other data layers as specified in the underlying metadata.



0 0.05 0.1
Miles

0 200 400
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_BarbersPoint_20250320\ONI_HIFL_BioReport_BarbersPoint_20250320.aprx

Hawaiian Islands Fiber Link Project - Barbers Point Cable Landing Site

Figure 3
Soils within Study Area



Study Area

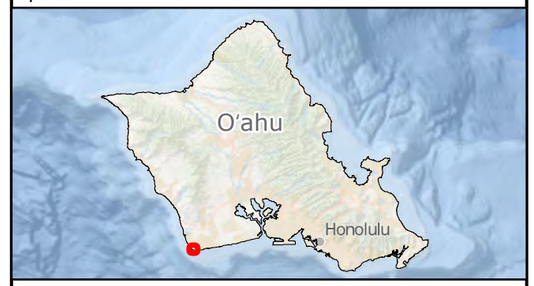
Roads

NRCS Soil Symbol

BS - Beaches

CR - Coral outcrop

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1

Miles

0 200 400

Feet

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_BarbersPoint_BarbersPoint_20250320\ONI_HIFL_BioReport_BarbersPoint_20250320.aprx

Hawaiian Islands Fiber Link Project - Barbers Point Cable Landing Site

Figure 4
Water Resources Mapped by NWI, NHD, and DAR



Study Area

Roads

National Wetlands Inventory

Estuarine and Marine Deepwater

Estuarine and Marine Wetland

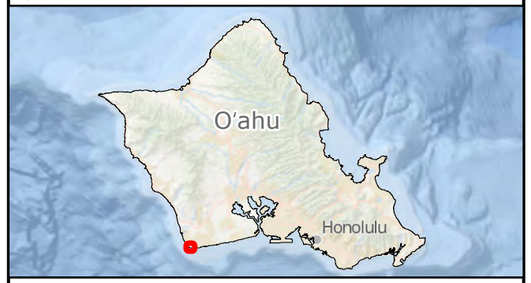
Estuarine and Subtidal Wetland

Riverine

National Hydrography Dataset

Canal/Ditch

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1

Miles

0 200 400

Feet

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_BarbersPoint_20250320\ONI_HIFL_BioReport_BarbersPoint_20250320.aprx



Hawaiian Islands Fiber Link Project - Barbers Point Cable Landing Site

Figure 5
Critical Habitat Within the Study Area and Vicinity

Study Area

Roads

Proposed Green Sea Turtle *(Chelonia mydas)* Critical Habitat

Marine

Monk Seal *(Neomonachus schauinslandi)* Critical Habitat

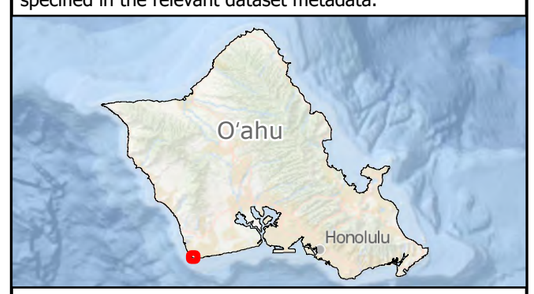
Marine

Terrestrial (extends from water's edge inland 16 feet [5 m] past shoreline)

Ecosystem Critical Habitat

Coastal - Unit 14

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1

Miles

0 200 400

Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_BarbersPoint_20250320\ONI_HIFL_BioReport_BarbersPoint_20250320.aprx

Appendix A

Representative Photographs of the Study Area



Photo 1. Looking southeast, depicting Maintained Beach Park Vegetation around park facilities and associated parking areas. Lat/Long: 21.297192, -158.10503.



Photo 2. Looking west toward Olai Street, depicting mowed grassy areas with weedy species intruding in maintained vegetation. Lat/Long: 21.297033, -158.104514.



Photo 3. Looking southwest toward the ocean from the eastern portion of the Study Area, depicting Maintained Beach Park Vegetation and park amenities. Lat/Long: 21.296957, -158.103515.



Photo 4. Looking northeast from the beach edge, depicting coconut palm trees (*Cocos nucifera*) and park amenities. Lat/Long: 21.296166, -158.104702.

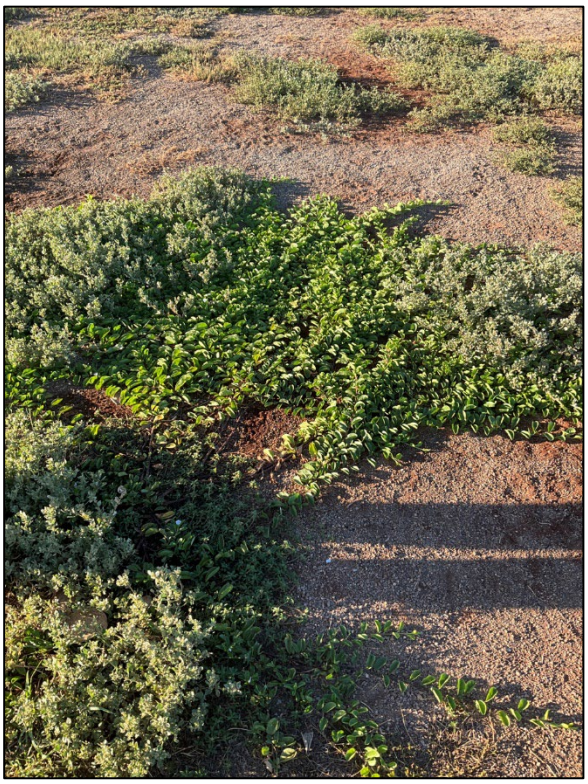


Photo 5. Patch of native pāʻū o Hiʻiaka (*Jacquemontia sandwicensis*) within the Maintained Beach Park Vegetation. Lat/Long: 21.297321 , -158.104765.



Photo 6. Looking east at the shoreline, depicting Coastal Strand vegetation. Lat/Long: 21.296164, -158.104696.



Photo 7. Looking west at the shoreline, depicting Coastal Strand vegetation primarily dominated by native plant species, including pōhuehue (*Ipomoea pes-caprae* subsp. *brasiliensis*). Lat/Long: 21.296084, -158.104005.

Hawaiian Islands Fiber Link Project – Maui Cable Landing Site

Biological Resources Survey Report

Prepared for:
Ocean Networks, Inc. (ONI)

Revised August 2025

TETRA TECH

complex world | CLEAR SOLUTIONS™

Table of Contents

1.0 Introduction 1
1.1 Project Description 1
2.0 Description of the Study Area 2
2.1 Climate 2
2.2 Topography and Soils 3
2.3 Surface Waters 3
2.4 Critical Habitat for Listed Species 4
3.0 Methods 4
3.1 Plants 5
3.2 Wildlife 5
3.2.1 Birds 5
3.2.2 Terrestrial Mammals 6
3.2.3 Invertebrates 6
3.2.4 Sea Turtles and Mammals 6
4.0 Results and Discussion 6
4.1 Plants 7
4.2 Wildlife 10
4.2.1 Birds 10
4.2.2 Terrestrial Mammals 12
4.2.3 Invertebrates 12
4.2.4 Sea Turtles and Marine Mammals 13
5.0 Conclusions and Recommendations 14
5.1 General 14
5.2 Plants 15
5.3 Wildlife 15
5.3.1 Listed Waterbirds 15
5.3.2 Listed Seabirds 15
5.3.3 Hawaiian Hoary Bat 16

5.3.4 Blackburn Sphinx Moth 16
5.3.5 Sea Turtles and Marine Mammals 17
6.0 References 18

List of Tables

Table 1. Monthly Rainfall at Nearby Wailuku Gage Prior to and During the Surveys 3
Table 2. Federally or State-listed Species with the Potential to Occur in the Study Area 8
Table 3. Native Plant Species Recorded in the Study Area During the Surveys 9
Table 4. Bird Species Recorded in the Study Area and Immediate Vicinity 11
Table 5. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity 13

List of Figures

Figure 1. Project Overview
Figure 2. Project Study Area and Vicinity
Figure 3. Soils Within the Study Area
Figure 4. Water Resources Mapped by NWI, NHD, and DAR
Figure 5. Critical Habitat in the Vicinity of the Study Area
Figure 6. Tree Tobacco Observations

List of Appendices

Appendix A. Representative Photographs of the Study Area

1.0 Introduction

The Hawaiian Islands Fiber Link (HIFL) Project is a proposed interisland submarine fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the State of Hawai‘i. The Project would interconnect the six main Hawaiian Islands, with cable landing sites on Kaua‘i, O‘ahu, Maui, Lāna‘i, Molokai, and Hawai‘i Island.

Tetra Tech was contracted to conduct a general biological survey within the 13.9-acre (5.6 hectare [ha]) terrestrial study area for the Maui cable landing site. The purpose of the survey was to characterize the species and habitats present, and to determine whether state or federally-listed threatened or endangered species (pursuant to the federal Endangered Species Act or Hawai‘i Revised Statutes [HRS] Chapter 195D), or otherwise rare plants or animals have the potential to occur and could be impacted by construction or operation of the Project. This report summarizes the results of the biological surveys conducted within the study area by Tetra Tech on July 15 – 16, 2024, and January 20, 2025.

1.1 Project Description

The HIFL Project involves construction, operation, and maintenance of an interisland fiber optic cable system that would interconnect the six main Hawaiian Islands to provide more robust, diverse, and reliable broadband connectivity throughout the state. The fiber optic cable system would distribute high-speed broadband to each island, with cable landing sites strategically located on Kaua‘i (Nukoli‘i Beach), O‘ahu (Barbers Point), Maui (Kahului), Lāna‘i (Mānele Harbor), Molokai (Molokai Yacht Club), and Hawai‘i Island (Hilo). The overall extent of the Project is shown in Figure 1.

The system would include both marine and terrestrial components, with the marine component comprising approximately 416 miles (669 kilometers [km]) of fiber optic cable surface-laid on the seabed between the islands. The cable would have a maximum diameter of approximately 1.1 inches (28 millimeters [mm]) and would be installed in five distinct segments spanning the nearshore state waters and surrounding U.S. federal waters.

At the Maui cable landing site, two subsurface boreholes would be installed using horizontal directional drilling (HDD) to allow the subsea fiber optic cables to traverse from the nearshore waters under the shoreline to the terrestrial Study Area. One borehole would punchout in the ocean to the west for the cable connecting to O‘ahu and the other borehole would punchout in the ocean to the east for the cable connecting to Hawai‘i Island. The terrestrial components that would be constructed within the Study Area would include a beach manhole (BMH), land-based cable (terrestrial cable), and a cable landing station (CLS). The BMH would be a below-ground reinforced concrete vault (or similar) which would serve as the connection chamber between the subsea cables and terrestrial cable. From the BMH, terrestrial cable would be installed in underground conduit extending under Kahului Beach Road to a manhole sited next to an existing utility pole. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, including the overhead system along state and

county roadways as well as underground conduit extending to University of Hawai'i (UH) Maui College.[1] The CLS for this site would be a new modular structure on the northwestern edge of the UH Maui College campus. The CLS would house cable operation and monitoring equipment and facilitate interconnection with the local telecommunications network. Additional underground conduit would be installed between the CLS and an adjacent building on the UH Maui College campus to connect the Project with the existing telecommunication and utility network.[2]

2.0 Description of the Study Area

As shown in Figure 2, the Study Area is located in Kahului on the north central coast of the island of Maui. It encompasses 13.9 acres (5.6 ha) and is comprised of two non-contiguous areas: the cable landfall at Kahului Harbor and the CLS at the UH Maui College (UHMC).

The Kahului Harbor portion of the Study Area is primarily comprised of an undeveloped area on the western harbor breakwater; it also includes a small section of State Highway 3400 (hereafter Kahului Beach Road) ROW and County of Maui's Keōpūolani Regional Park (Figure 2). This portion of the Study Area includes portions of three tax map keys (TMK): (2)3-7-001:021 (por.) (owned by State of Hawai'i; assigned to the Department of Transportation via Executive Order); (2)3-7-001:999 (por.) (Kahului Beach Road rights-of-way [ROW]); and (2)3-8-007:001 (por.) (owned by County of Maui). The Study Area is bordered on the north by the west breakwater of Kahului Harbor and the Pacific Ocean, and on the south by the Kahului boat ramp and parking area (Figure 2).

The UHMC portion of the Study Area encompasses the Kahului Recycling and Redemption Center, a portion of the UHMC science building, and a campus parking area. It is located within TMK (2)3-8-007:040 (por.), which is owned by UH. This portion of the Study Area is bordered by Wahinepio Avenue on the north. The Maui Arts & Cultural Center occurs to the northeast and the Maui Nui Botanical Gardens occurs to the west beyond Wahinepio Avenue.

2.1 Climate

The climate in the Study Area is characterized as arid (Price et al. 2012). The closest functioning National Weather Service (NWS) rainfall gage to the Study Area is in Wailuku, located 1.5 mile (2.4 km) to the west. The monthly rainfall totals recorded at the gage prior to and during the surveys are shown in Table 1. The year-to-date total for this rain gage through the end of July 2024 and December 2024 was 82 and 62 percent of average, respectively (NWS 2025a). Drought conditions for the area were characterized as moderate to abnormally dry prior to the July 2024 surveys, suggesting dry conditions during the July 2024 surveys (NWS 2024a, 2024b). Severe drought conditions were reported prior to the January 2025 survey, suggesting very dry conditions during the January 2025 survey (NWS 2025b); a brief period of

[1] The segment of terrestrial fiber on the existing utility system is described herein to provide an overview of the entire system but is not further addressed by this study because it comprises existing third-party infrastructure.

[2] Existing buildings were not included in the surveys for biological resources because the Project would not involve any new infrastructure or associated ground disturbance in the buildings.

heavy rainfall that occurred after the January 2025 survey accounts for the above average rainfall recorded for the month (Table 1; NWS 2025a; NRCS NWCC 2024).

Table 1. Monthly Rainfall at Nearby Wailuku Gage Prior to and During the Surveys

Date	Rainfall Total; Percentage of Average
May 2024	0.84 inches; 40%
June 2024	0.26 inches; 38%
July 2024	0.86 inches; 102%
August 2024	2.62 inches; 285%
September 2024	0.03 inches; 13%
October 2024	0.85 inches; 44%
November 2024	0.79 inches; 18%
December 2024	0.40 inches; 8%
January 2025	8.80 inches; 148%
Sources: NWS 2025a; NRCS NWCC 2024 Note: Months when surveys occurred are highlighted in light grey.	

2.2 Topography and Soils

The Study Area is comprised of predominately flat slopes with elevations ranging from sea level to approximately 30 feet (9 meters [m]) above mean sea level gently sloping up from makai to mauka.

The Natural Resources Conservation Service (NRCS) characterizes the soils within the Kahului Harbor portion of the Study Area as Puʻuone sand, 7 to 30 percent slopes, and Fill land; in addition, a portion of this section of the Study Area is outside of the NRCS soil survey area such that no soil mapping unit is available (Figure 3; NRCS 2024). Puʻuone sand is derived from coral seashells with a typical profile of sand and cemented material characterized as somewhat excessively drained with medium runoff (NRCS 2024). Fill land typically consist of a profile of silty clay loam, sand, and bedrock, and are characterized as well draining with low runoff (NRCS 2024). The west breakwater harbor area in the northeastern portion of the Study Area is composed of marine sediments and fill from previous harbor dredging efforts (HDOT 2007). Soils within the UHMC portion of the Study Area are comprised of Puʻuone sand, 7 to 30 percent slopes (Figure 3; NRCS 2024).

2.3 Surface Waters

The Study Area is situated within the ʻĪao watershed which encompasses roughly 22 square miles (57 km^2) (CWRM 2019, CWRM 2022). Water resources identified by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data (USFWS 2024a), the U.S. Geological Survey (USGS)

National Hydrography Dataset (NHD; USGS 2023), and the State of Hawai'i Division of Aquatic Resources (DAR) dataset (DAR 2008) in the Study Area and immediate vicinity are shown in Figure 4.

One surface water feature is identified within the Study Area; NHD maps a freshwater lake/pond near the northeastern boundary of the Kahului Harbor portion of the Study Area (Figure 4; USGS 2023). NWI also identifies estuarine and marine wetlands along the coastline to the north and southeast of this portion of the Study Area, and maps Kahului Harbor and the ocean in the vicinity as estuarine and marine deepwater. ʻĪao Stream is the closest stream to the Study Area, occurring roughly 0.9 miles (1.4 km) to the northwest (Figure 4; USFWS 2024a). No water features are identified within the UHMC portion of the Study Area.

No wetlands or areas with potential wetland function are mapped by the Maui County Wetland Overlay Map within either the Kahului Harbor or UHMC portions of the Study Area (Maui County 2024).

2.4 Critical Habitat for Listed Species

No critical habitat has been designated or proposed by USFWS or the National Oceanic and Atmospheric Administration (NOAA) within the Study Area. However, marine critical habitat for the endangered Hawaiian monk seal/ ʻīlio-holo-i-ka-uaua (*Neomonachus schauinslandi*) has been designated along the northern edge of the Study Area along the harbor's west breakwater and for the ocean areas in the vicinity of the Kahului Harbor portion of the Study Area (Figure 5; NOAA 2015). The marine portion of the monk seal critical habitat encompasses the marine habitat surrounding the island out to the 656 foot (200 m) bathymetric contour (NOAA 2015). Terrestrial critical habitat for the monk seal is designated roughly 275 feet (84 m) north of the Kahului Harbor portion of the Study Area (Figure 5). Terrestrial critical habitat includes the water's edge inland to approximately 16 feet (5 m) adjacent to Kahului Beach Road.

NOAA has proposed critical habitat for the Central North Pacific distinct population segment of the threatened green sea turtle/ honu (*Chelonia mydas*) adjacent to the Kahului Harbor portion of the Study Area. Proposed marine critical habitat includes all waters surrounding the island from the mean high water line to 65.6 feet (20 m) water depth (Figure 5; NOAA 2023). No proposed terrestrial critical habitat for green sea turtles occurs in the Study Area. The closest proposed terrestrial critical habitat for green sea turtles occurs at Kaʻehu Beach and Kanahā Beach (approximately 1 mile [1.6 km] northwest and 2 miles [3.2 km] east of the Study Area, respectively) (Figure 5; USFWS 2023a, USFWS 2024b).

Two critical habitat units for the endangered Blackburn's sphinx moth (*Manduca blackburni*), Kanahā Pond and Kanahā Park, have been designated approximately 1.3 miles (2 km) and 2 miles (1.6 km) east of the Study Area, respectively (USFWS 2003, USFWS 2024a). The Kanahā Pond unit was occupied by the Blackburn's sphinx moth at the time of designation (USFWS 2003).

3.0 Methods

Prior to the field surveys, Tetra Tech conducted a review of relevant publicly available literature and data with respect to biological resources in and near the Study Area. This review included environmental

assessments and environmental impact statements, NWI and NHD data, scientific journals and reports, the USFWS Information for Planning and Consultation (IPaC) tool, and available, unpublished data relevant to the natural history and ecology of the area. In addition, Tetra Tech reviewed available geospatial data, aerial photographs, and topographic maps of the area to identify occurrences of state or federally-listed species, or habitats that could harbor these species. The biological field surveys were conducted by Tetra Tech on July 15 and 16, 2024 and January 20, 2025. Details regarding the field survey methodologies are provided below.

3.1 Plants

Pedestrian surveys were conducted to identify and record common plant species and dominant vegetation types, as well as rare or listed plant species within the Study Area. Areas more likely to support native plants (e.g., rocky outcrops and shady areas) were more intensively examined. Plant identifications were made in the field; plants that could not be positively identified were photo-documented for comparison with the recent taxonomic literature.

Plants recorded during the surveys are indicative of the season and environmental conditions at the time of the surveys. The presence and location of plants can be influenced by seasonal and temporal changes; therefore, it is possible additional species may occur within the Study Area but were not present during these surveys.

The taxonomy and nomenclature of plants are in accordance with Wagner et al. (2023). Common/ Hawaiian names are provided first, followed by scientific names in parentheses. If no common or Hawaiian name is known, only the scientific name is provided.

3.2 Wildlife

Wildlife surveys consisted of observations and identification of birds, terrestrial and marine mammals, and conspicuous invertebrate species encountered while searching the Study Area. Tetra Tech recorded all wildlife seen or heard while walking and driving within the Study Area coupled with visual observation of scat, tracks, and other animal sign. Habitats or plants that could support listed wildlife species were also identified if present (such as host plants for listed invertebrates or water features as potential habitat for listed Hawaiian waterbirds). Specific survey methods of each wildlife group are provided below.

3.2.1 Birds

All birds seen or heard while walking and driving within the Study Area and vicinity were recorded. Habitats or plants that could support listed birds were also identified if present (e.g., water features as potential habitat for listed Hawaiian waterbirds). Scientific nomenclature for birds follows Birds of the World (Billerman et al. 2022).

3.2.2 Terrestrial Mammals

The terrestrial mammal surveys were limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign while walking and driving within the Study Area. Scientific names for mammals follow Tomich (1986).

Ultrasonic bat recorders were not deployed for the endangered Hawaiian hoary bat/ ʻōpeʻapeʻa (*Lasiurus semotus*) as part of the survey. Rather, as USFWS and State of Hawaiʻi Division of Forestry and Wildlife (DOFAW) recognize all woody vegetation greater than 15 feet (4.6 m) tall as potential bat roosting habitat (DOFAW 2015, USFWS 2023b), the presence/absence of suitable bat foraging and roosting habitat within the Study Area was noted.

3.2.3 Invertebrates

In general, observations of large and conspicuous insects and invertebrates were recorded incidentally to wildlife surveys while walking and driving through the Study Area. Invertebrates were identified through visual observations and were not collected as specimens in the field. Surveys also recorded any host plants for the endangered Blackburn's sphinx moth. Larvae of the Blackburn's sphinx moth feed on plants in the nightshade family (Solanaceae), including the non-native, weedy tree tobacco (*Nicotiana glauca*), which is common on Maui. If encountered in the Study Area or vicinity during the surveys, tree tobacco plants were mapped and individuals were scanned for Blackburn's sphinx moth larvae, eggs, or evidence of larval feeding (e.g., chewed stems, frass, or leaf damage). Scientific nomenclature for terrestrial invertebrates follows Nishida (2002), and WoRMS Editorial Board (2024) for marine invertebrates.

3.2.4 Sea Turtles and Mammals

This survey focused on characterizing the nearshore marine and shoreline habitat for listed sea turtles and protected marine mammals (e.g., monk seals), and was limited to visual observations from the shoreline using binoculars. Biologists scanned the nearshore marine waters and suitable nearshore terrestrial habitat for individuals or their potential habitat.

4.0 Results and Discussion

The biological resources in the Study Area have been highly modified by historic and current land uses and the introduction of invasive species, which has greatly reduced the number and abundance of native species and habitats suitable for native species. Paved roads, sidewalks, parking areas, landscaping, and various infrastructure associated with the road ROW, Kahului Recycling and Redemption Center, and UHMC campus are present in the Study Area. The west breakwater harbor area has evidence of heavy human use such as off-road vehicle use and dumping. Representative photographs from the surveys are presented in Appendix A.

No federally or state-listed plant or animal species were observed within the Study Area during the surveys. However, threatened green sea turtles were observed immediately outside of the Study Area offshore of the western breakwater. Additionally, endangered Hawaiian stilts/ ae'o (*Himantopus mexicanus knudseni*) were recorded within the vicinity of the Study Area along Kahului Beach Road. Several additional listed animal species, including listed seabirds, Hawaiian hoary bat, and Blackburn's sphinx moth, may occasionally occur in or traverse the Study Area. Listed species with the potential to occur in the Study Area are summarized in Table 2 and are discussed in further detail below.

4.1 Plants

No federal or state listed threatened, endangered, proposed listed, or candidate plant species were observed in the Study Area during the biological surveys. Ten native plant species were observed in the Study Area (Table 3). Six of these are naturally-occurring (wild) native plant species, while the remaining four species have been planted within the UHMC portion of the Study Area. All these native plants species are considered common throughout the Hawaiian Islands.

Table 2. Federally or State-listed Species with the Potential to Occur in the Study Area

Common/Hawaiian Name(s)	Scientific Name	Listing Status[1]	Critical Habitat in Study Area	Potential Occurrence in Study Area
Birds				
Hawaiian coot/ ʻalae keʻo keʻo	*Fulica alai*	SE, FE	None Designated	Preferred habitat not present, but could fly over or opportunistically congregate around any ephemeral ponded water in the Study Area.
Hawaiian stilt/ aeʻo	*Himantopus mexicanus knudseni*	SE, FE	None Designated	No suitable nesting habitat present, but may use grassy fields adjacent to the Study Area for foraging and loafing, or fly may over.
Hawaiian petrel/ ʻuaʻu	*Pterodroma sandwichensis*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Newell's shearwater/ ʻaʻo	*Puffinus auricularis newelli*	ST, FT	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Band-rumped storm-petrel/ ʻakēʻakē	*Hydrobates castro*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Terrestrial Mammals				
Hawaiian hoary bat/ ʻōpeʻapeʻa	*Lasiurus semotus*	SE, FE	None Designated	Could traverse or forage in the Study Area or roost in vegetation > 15 feet in height.
Sea Turtles and Marine Mammals				
Green sea turtle/ honu	*Chelonia mydas*	ST, FT	Proposed marine in immediate vicinity	Not known to nest in or near the Study Area, but could forage offshore.
Hawaiian monk seal/ ʻīlio-holo-i-kauaua	*Neomonachus schauinslandi*	SE, FE	Designated marine and terrestrial in immediate vicinity	Unlikely to haul out in the Study Area, but could haul out in the vicinity or forage offshore.

1. FE = Federally endangered; SE = State endangered; FT = Federally threatened; ST = State threatened.

Table 3. Native Plant Species Recorded in the Study Area During the Surveys

Common/ Hawaiian Name(s)	Scientific Name	Status	Kahului Harbor	UHMC
ʻakiʻaki	*Sporobolus virginicus**	I	✓	
ʻākulikuli	*Sesuvium portulacastrum**	I	✓	
hau	*Hibiscus tiliaceus*	I		✓
kīpūkai, seaside heliotrope	*Heliotropium curassavicum**	I	✓	
kou	*Cordia subcordata*	I		✓
naio	*Myoporum sandwicense* subsp. *sandwicense*	E		✓
naupaka kahakai	*Scaevola taccada* var. *taccada**	I	✓	
pāʻū-o-Hiʻiaka	*Jacquemontia sandwicensis**	E	✓	
pōhuehue	*Ipomoea pes-caprae* subsp. *brasiliensis*	I		✓
ʻuhaloa	*Waltheria indica**	I	✓	✓

Status: E = Endemic (native only to the Hawaiian Islands); I = Indigenous (native to the Hawaiian Islands and elsewhere).
* = Naturally-occurring (i.e., wild, and not planted)

Kahului Harbor Portion of the Study Area

Vegetation in this portion of the Study Area is consists of three vegetation types: Coastal Strand, Ruderal Vegetation, and Landscaped Areas. These vegetation types are described in more detail below.

Coastal Strand: This vegetation type occurs adjacent to the shoreline near the west breakwater area along the northern boundary of the Kahului Harbor portion of the Study Area. It is dominated by non-native species that occur in patches among large open areas of sand, dirt, and rocky rubble (Appendix A, Photos 1 – 2). The vegetation is influenced by salt spray and wind, and is low in stature. Common plant species in the coastal strand include the non-native ironwood (*Casuarina equisetifolia*), Indian fleabane (*Pluchea indica*), Australian saltbush (*Atriplex semibaccata*), saltbush (*Atriplex suberecta*), *Sporobolus* sp., buffelgrass (*Cenchrus ciliaris*), silky jackbean (*Canvalia sericea*), and the native ʻākulikuli (*Sesuvium portulacastrum*). Other native plants found in this vegetation type include pāʻū-o-Hiʻiaka (*Jacquemontia sandwicensis*), kīpūkai (*Heliotropium curassavicum*), naupaka kahakai (*Scaevola taccada* var. *taccada*), and ʻakiʻaki (*Sporobolus virginicus*).

Ruderal Vegetation: Ruderal vegetation occurs in the area between the west breakwater and the parking area for the Kahului boat ramp. It is comprised of mostly non-native, low stature grasses, shrubs, and herbaceous species (Appendix A, Photo 3). Dominant plants in this vegetation type include buffelgrass, Bermuda grass (*Cynodon dactylon*), rattlepod (*Crotalaria assamica*), prostrate spurge (*Euphorbia prostrata*), swollen fingergrass (*Chloris barbata*), radiate fingergrass (*Chloris radiata*), false mallow (*Malvastrum coromandelianum*), creeping indigo (*Indigofera spicata*), red-flowered sida (*Sida*

ciliaris), Indian fleabane, *Euploca procumbens*, silky jackbean, vining cow pea (*Macroptilium atropurpureum*), and koa haole (*Leucaena leucocephala* subsp. *leucocephala*). Two native species — ʻuhaloa (*Waltheria indica*) and pāʻū-o-Hiʻiaka — are sparsely scattered in this vegetation type.

Landscaped Areas: The vegetation along the Kahului Beach Road ROW is comprised of landscaped areas. Landscaped areas consist of maintained lawns of primarily Bermuda grass and buffelgrass with plantings of coconut palm/ niu (*Cocos nucifera*) and ironwood into which weedy species such as Chinese violet (*Asystasia gangetica*) have encroached (Appendix A, Photo 4).

UHMC Portion of the Study Area

Vegetation within the UHMC portion of the Study Area is entirely comprised of Landscaped Areas.

Landscaped Areas: Landscaped Areas are present adjacent to the Recycling and Redemption Center and along the edges of the UHMC parking lot and buildings. This vegetation type consists of maintained lawns of primarily Bermuda grass and buffelgrass with plantings of native and non-native ornamental species into which weedy species have intruded (Appendix A, Photos 5 – 8). The native naio (*Myoporum sandwicense* subsp. *sandwicense*) is planted adjacent to the Recycling and Redemption Center. The UHMC parking lot and buildings are bordered by a few plantings of coconut palm and the native pōhuehue (*Ipomoea pes-caprae* subsp. *brasiliensis*), hau (*Hibiscus tiliaceus*), and kou (*Cordia subcordata*).

Weedy species growing among and along the disturbed edges of the landscaped areas include buffelgrass, Guinea grass (*Megathyrsus maximus*), pitted beardgrass (*Bothriochloa pertusa*), airport grass (*Bothriochloa bladhii*), swollen fingergrass, Carolina love grass (*Eragrostis pectinacea*), love grass (*Eragrostis amabalis*), red-flowered sida, coat buttons (*Tridax procumbens*), scarlet boerhavia (*Boerhavia coccinea*), *Euploca procumbens*, hairy spurge (*Euphorbia hirta*), hairy pigweed (*Portulaca pilosa*), creeping indigo (*Indigofera spicata*), khaki weed (*Alternanthera pungens*), telegraph weed (*Heterotheca grandiflora*), nodeweed (*Synedrella nodiflora*), Alyce clover (*Alysicarpus vaginalis*), wedelia, golden crown-beard (*Verbesina encelioides*), obscure morning glory (*Ipomoea obscura*), koa haole, and vining cow pea. The native ʻuhaloa has established naturally along the disturbed edges in some areas.

4.2 Wildlife

4.2.1 Birds

Twelve bird species were recorded in the Study Area and immediate vicinity during the surveys (Table 4). One indigenous great frigatebird/ ʻiwa (*Fregata minor*) was observed flying over the Study Area. The remainder of the bird species recorded are non-native to the Hawaiian Islands, and are species commonly found in urban areas. The most common bird species recorded during the surveys were rock pigeon (*Columba livia*), common myna (*Acridotheres tristis*), and zebra dove (*Geopelia striata*). Two of the bird species observed are protected by the Migratory Bird Treaty Act (MBTA) (Table 4). Although not observed during the surveys, it is possible that other MBTA-protected species such as wedge-tailed

shearwater/ ʻuau kani (*Ardenna pacifica*), wandering tattler/ ʻūlili (*Tringa incana*), Pacific golden-plover/ kōlea (*Pluvialis fulva*), and ruddy turnstone/ ʻakekeke (*Arenaria interpres*) could also occasionally occur in or transit the Study Area. Additional information about state and federally listed birds that have the potential be present in or traverse the Study Area, is provided below.

Table 4. Bird Species Recorded in the Study Area and Immediate Vicinity

Common/ Hawaiian Name(s)	Scientific Name	Status	Kahului Harbor	UHMC
Cattle egret	*Bubulcus ibis* [1]	NN	✓	
Common myna	*Acridotheres tristis*	NN	✓	✓
Common waxbill	*Estrilda astrild*	NN		✓
Feral chicken	*Gallus domesticus*	NN	✓	✓
Great frigatebird/ ʻiwa	*Fregata minor*	I	✓	
House sparrow	*Passer domesticus*	NN	✓	✓
Java sparrow	*Lonchura oryzivora*	NN		✓
Northern cardinal	*Cardinalis cardinalis* [1]	NN		✓
Red-crested cardinal	*Paroaria coronata*	NN	✓	✓
Rock pigeon	*Columba livia*	NN	✓	
Warbling white-eye	*Zosterops japonicus*	NN		✓
Zebra dove	*Geopelia striata*	NN	✓	✓

Status: E = Endemic, I = Indigenous, NN = Non-native established species.

1. Protected by the Migratory Bird Treaty Act (MBTA).

Listed Waterbirds: Six Hawaiian stilt individuals were observed foraging, loafing, and displaying territorial behaviors in the grassy fields roughly 600 feet (182 m) south of the Kahului Harbor portion of the Study Area to the west of Kahului Beach Road (Appendix A, Photo 9). An additional three Hawaiian stilts were observed roughly 500 feet (152 m) north of the Kahului Harbor portion of the Study Area on the lawn at Keōpūolani Regional Park on the west side of Kahului Beach Road. Hawaiian stilts may opportunistically use grassy lawns or upland fields within the vicinity for foraging and loafing. They may also be found wherever ephemeral or persistent standing water occasionally occur. Hawaiian stilts tend to nest in shallow freshwater wetlands on dikes, islands, or other high spots with sparse emergent vegetation cover and have a strong tendency to nest in human made impoundments (Robinson et. al 2020). No suitable nesting habitat for Hawaiian stilts occurs in the Study Area.

The endangered Hawaiian coot/ ʻalae keʻokeʻo (*Fulica alai*) was not observed during the surveys and its preferred habitats (e.g., wetlands, streams, ponds, mudflats, reservoirs) are not present in the Study Area; however, during heavy rain events resulting in standing water, listed waterbirds could congregate

in the Study Area or fly over while transiting between suitable habitat found outside of the Study Area. Suitable habitat for listed waterbirds occurs approximately 1.3 miles (2 km) to the east of the Study Area at Kanahā Pond Wildlife Sanctuary.

Listed Seabirds: The endangered Hawaiian petrel/ ʻuaʻu (*Pterodroma sandwichensis*), threatened Newell's shearwater/ ʻaʻo (*Puffinus newelli*), and endangered band-rumped storm-petrel/ ʻakēʻakē (*Hydrobates castro*) (collectively referred to as listed seabirds) have not been documented in the Study Area, and suitable nesting habitat does not occur in the Study Area. However, suitable nesting habitat exists in upper elevations of Maui Island, and these birds have the potential to fly over the Study Area at night between March and December while transiting between the ocean and upper elevation areas. These listed seabirds are known to be attracted to outdoor lighting at night; after circling the lights, they can become exhausted and collide with nearby structures or fall to the ground (USFWS 2023b).

4.2.2 Terrestrial Mammals

Three non-native terrestrial mammalian species were detected in the area during the surveys. A small Indian mongoose (*Herpestes auropunctatus*), domestic dog (*Canis familiaris*), and feral cats (*Felis catus*) were seen in the Study Area. Although not directly observed, other introduced mammals, such as house mice (*Mus musculus*) and rats (*Rattus* spp.), are likely to occur within the Study Area.

Recent studies have found that Hawaiʻi's only native, extant terrestrial mammal—the endangered Hawaiian hoary bat—is more abundant across the Hawaiian Islands than previously understood (Gorresen et al. 2013, Bonaccorso et al. 2015, USGS 2019). This species will forage in open and semi-cluttered landscapes in a wide range of habitats and vegetation types, such as in open areas, at forest edges or within gaps, and over open bodies of water including streams, ponds, and along shorelines (Jacobs 1994, Jacobs 1999, Bonaccorso et al. 2015, Pinzari et al. 2019). Hawaiian hoary bats are tree-roosting bats and roost in various native and non-native trees (USFWS 1998, Gorresen et al. 2013, Montoya-Aiona et al. 2023). Some trees within the Study Area (e.g., ironwood and kou) are over 15 feet (4.6 m) tall and have the potential to function as bat roost trees (DOFAW 2015, USFWS 2023b). Thus, Hawaiian hoary bats may transit, roost, or forage in portions of the Study Area.

4.2.3 Invertebrates

Large and conspicuous invertebrates incidentally observed during the surveys are listed in Table 5. Along the shoreline in the Kahului Harbor portion of the Study Area, three native marine invertebrate taxa were observed; endemic marine gastropods known in Hawaiʻi as ʻopihi (*Cellana* sp.), as well as speckled periwinkle/ pūpū kolea (*Littoraria pintado*) and the helmet urchin/ hāʻukeʻuke (*Colobocentrotus atratus*) were observed. One native dragonfly species, globe skimmer (*Pantala flavescens*), was also recorded in the Study Area.

Table 5. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity

Common / Hawaiian Name(s)	Scientific Name	Status	Kahului Harbor	UHMC
Black saddlebags	*Tramea lacerata*	NN	✓	
Globe skimmer	*Pantala flavescens*	I		✓
Grasshopper	*Oedaleus* sp.	NN	✓	
Helmet urchin/ hā'uke'uke	*Colobocentrotus atratus*	I	✓	
House fly	*Musca domestica*	NN	✓	
Hover Fly	Syrphidae *	NN	✓	
Large orange sulphur	*Phoebis agarithe*	NN	✓	
Monarch	*Danaus plexippus*	NN		✓
'Opihi	*Cellana* sp.	E	✓	
Oriental flower beetle	*Protaetia orientalis*	NN		✓
Pea blue	*Lampides boeticus*	NN	✓	
Speckled periwinkle/ pūpū kolea	*Littoraria pintado*	I	✓	
Seven spot lady beetle	*Coccinella septempunctata*	NN		✓
Wasp	Vespidae*	NN		✓
Western honeybee	*Apis mellifera*	NN		✓

Status: E = Endemic, I = Indigenous, NN = Non-native species.

* = Represents order or family because lower taxonomic identification could not be made in the field.

Blackburn's sphinx moth: No Blackburn's sphinx moth caterpillars or eggs were observed within the Study Area during the surveys. However, five tree tobacco individuals, a common larval host plant for the endangered Blackburn's sphinx moth, were recorded immediately adjacent to the Kahului Harbor portion of the Study Area in the Kahului Harbor parking lot (Figure 6). The two native larval host plants for Blackburn's sphinx moth (*Nothocestrum latifolium* and *N. breviflorum*) were not found and are not likely to occur in the Study Area. In addition, no native adult stage host plants for the Blackburn's sphinx moth were observed in the Study Area. Because the Blackburn's sphinx moth is known to occur relatively close to the Study Area, and tree tobacco can readily colonize disturbed areas (Vélez-Gavilán 2023), it is possible this species could occur in the Study Area or immediate vicinity.

4.2.4 Sea Turtles and Marine Mammals

No sea turtles, monk seals, or other marine mammals were observed within the Study Area during the surveys. However, two sea turtles were observed in the ocean approximately 300 feet (91 m) north of the breakwater. Green sea turtles often forage in shallow reefs throughout the main Hawaiian Islands

where their food source is plentiful (Balazs et al. 1987). In Hawai'i, green sea turtles mostly nest on sandy beaches close to where they were hatched (NOAA 2023, USFWS 2023a), and the species is not known to nest in the Study Area or along the breakwater.

The endangered hawksbill sea turtle (*Eretmochelys imbricata*) is a rare species of sea turtle that uses similar feeding grounds to the green sea turtle (Gaos et. al. 2020) and nests on a wide range of substrates (USFWS 2023b). There is a lack of available information on the nesting and foraging locations for this species, but they have the potential to forage in the ocean offshore of the Study Area.

No Hawaiian monk seals were observed during the surveys. Monk seals spend most of their time in the ocean, but also haul out on land for resting, pupping, nursing, molting, and avoiding predators. Monk seals primarily haul out on sandy beaches, but also utilize coral rubble, rocky and volcanic substrates (NMFS 2007, NOAA 2011). Monk seals are unlikely to haul out on the rubble-mounded breakwater bordering the Study Area due to the substrate and high wind wave and swell energy in this area. As stated in Section 2.4, the beach north of the west breakwater is designed as monk seal critical habitat. This section of critical habitat was determined to have significant haul out areas (NMFS 2014).

5.0 Conclusions and Recommendations

As described in Section 4, most of the plants and animals observed in the Study Area are non-native to the Hawaiian Islands. Although no federally or listed species were recorded within the Study Area, green sea turtles and endangered Hawaiian stilts were observed in the vicinity of the Study Area during the biological surveys. Several other listed wildlife species have the potential to occasionally occur in or transit through the Study Area, particularly listed seabirds, the Hawaiian hoary bat, and the Blackburn's sphinx moth. Recommended measures to avoid and minimize impacts to these species are outlined below.

5.1 General

In addition to the species-specific measures detailed below, Tetra Tech recommends the following general measures to avoid and minimize impacts to biological resources:

- Although non-native weedy species are common in the Study Area, invasive species minimization measures should be implemented to avoid unintentional introduction or transport of new invasive species to the area. This includes utilizing on-site gravel, rock, and soil (or purchasing from a local supplier) when practicable; utilizing certified, weed-free seed mixes; and washing construction equipment and/or visually inspecting for excessive debris, plant materials, and invasive or harmful non-native species as appropriate.
- Staff should be trained to identify listed wildlife or MBTA-protected birds that may be found on-site (e.g., Hawaiian stilts) and to take appropriate steps if listed wildlife species are found.
- If downed listed wildlife species are observed at the Project, notify USFWS and DOFAW as soon as possible.

5.2 Plants

No listed plant species were observed in the Study Area. The vegetation in the Study Area is disturbed from previous land use activities, and non-native invasive plants dominate. Four of the native plant species in the Study Area are planted (not naturally occurring). Tetra Tech recommends the following with regards to plants:

- If landscaping is installed as part of the Project, use non-invasive plants and incorporate native plant species to the maximum extent practicable.

5.3 Wildlife

With the exception of the great frigatebird, marine invertebrates, and a native dragonfly, nearly all the animal species recorded in the Study Area are not native to the Hawaiian Islands. Listed Hawaiian stilts and green sea turtles were documented in the vicinity, but outside of the Study Area. The habitat in the Study Area is generally not suitable for listed wildlife. However, several listed animal species have the potential to occasionally occur in or transit the Study Area.

5.3.1 Listed Waterbirds

Hawaiian stilts were detected in grassy fields in the vicinity of the Study Area. Suitable foraging habitat is limited in the Study Area and no nesting habitat for stilts occurs in the Study Area. However, Hawaiian stilt could fly over the Study Area in transit to other areas or could temporarily utilize portions of the Study Area if standing water is present. To avoid impacts to the Hawaiian stilt (and other listed waterbirds) during Project construction and operation, Tetra Tech recommends the following based on avoidance and minimization measures provided by USFWS (2023b):

- Avoid creating areas with standing water.
- If listed waterbirds are found in the Study Area during active construction, cease all activities within 100 feet (30 m) of the bird(s), and do not approach the bird(s). Work may continue after the bird leaves the area of its own accord.

5.3.2 Listed Seabirds

The Study Area does not provide suitable nesting or foraging habitat for the three listed seabirds. However, individuals may fly over the area during the breeding, nesting, and fledging seasons (March 1 - December 15) and may be attracted to nighttime lighting. Disorientation and fallout as a result of light attraction could occur for individuals attracted to unshielded nighttime lighting. Juvenile birds are particularly vulnerable to light attraction, and grounded birds are vulnerable to mammalian predators or vehicle strikes (Rodríguez et al. 2017). Tetra Tech recommends the following measures to avoid and minimize potential impacts to listed seabirds:

- If operational on-site lighting is required, it should consist of fixtures that will be shielded and/or directed downward to prevent upward radiation, triggered by a motion detector, and fitted with non-white light bulbs to the extent possible.
- Avoid the use of nighttime lighting that could attract seabirds during the seabird peak fallout period (September 15 - December 15).
- If a grounded seabird is found, notify USFWS and DOFAW immediately. These agencies may recommend contacting the Maui Nui Seabird Recovery Project at (808) 573-2473.
- Minimize construction of overhead lines to reduce the collision risk for seabird species.

5.3.3 Hawaiian Hoary Bat

Direct impacts to bats could occur if roost trees are disturbed or through the use of barbed wire. Tetra Tech recommends the following avoidance measures provided by USFWS (2023b):

- To prevent entanglements, do not use barbed wire for fencing.
- Do not trim, disturb, or remove woody vegetation taller than 15 feet (4.6 m) between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

5.3.4 Blackburn Sphinx Moth

Five tree tobacco plants (a larval host plant for the Blackburn's sphinx moth) were recorded immediately adjacent to the Kahului Harbor portion of the Study Area. Although no evidence of the endangered Blackburn's sphinx moth was recorded during the survey, this listed species has the potential to use tree tobacco in the Study Area and vicinity, if present. To avoid establishment of this host plant in the Study Area and attraction of the listed Blackburn's sphinx moth, Tetra Tech recommends the following based on guidance from USFWS (2023b):

- Prior to any ground-disturbing activities, survey the Project area for tree tobacco. This survey should be conducted with adequate time to address agency inspection, removal, and buffer requirements.
- If tree tobacco plants under 3 feet (0.9 m) tall are observed, remove the plants immediately.
- If tree tobacco plants over 3 feet in height are present, USFWS recommends contacting them for additional guidance. Based on previous consultations, USFWS and DOFAW will likely recommend having a qualified biologist thoroughly search the plant(s) for eggs, larvae, and signs of larval feeding (chewed stems, frass, or leaf damage). Ideally this survey should be conducted during the wettest portion of the year (usually November-April or several weeks after a significant rain).
    - If moths, eggs, or larvae are found during the survey, the location of the plant(s) should be mapped and USFWS and DOFAW should be contacted for further guidance.

- If there are no signs of Blackburn's sphinx moth on tree tobacco plants over 3 feet in height, USFWS and DOFAW will likely state the above-ground portion of the tree tobacco can be cut and removed within 24 hours of the survey, and the cut stems painted with herbicide (without disturbing soil and roots) to prevent plant growth. USFWS and DOFAW should be contacted for the site-specific disturbance-free buffer around the plant(s). The buffer should remain in place for a minimum of 3 months or until a heavy rainfall event occurs.

5.3.5 Sea Turtles and Marine Mammals

No sea turtles or marine mammals were detected within the Study Area during the surveys, but two sea turtles were observed in the ocean north of the Kahului Harbor portion of the Study Area, and sea turtles and monk seals could use marine waters in the vicinity of this portion of the Study Area. Tetra Tech recommends following the Standard Local Operating Procedures for Endangered Species in the Central and Western Pacific Region (Pac-SLOPES) provided by U.S. Army Corps of Engineers (USACE 2022) to minimize impacts to ESA-listed marine species (sea turtles, marine mammals, sharks, rays) and their habitats. Tetra Tech also recommends the following avoidance measures adapted from USFWS (2023b):

- Do not use vehicles on or modify the beach/shoreline area during the sea turtle nesting or hatching season (May through December).
- Have a biologist (or qualified, trained individual) familiar with sea turtles and monk seals conduct a visual survey of the project site immediately prior to work to ensure no sea turtles or monk seals are present. If these species are found within the project area, cease all mechanical or construction activities within 100 feet (30 m) until the animal voluntarily leaves the area.
- Remove any project-related debris, trash, or equipment from the beach/shoreline if not actively being used.
- Do not stockpile project-related materials in the intertidal zone, reef flats, sandy beach, and adjacent vegetated areas.
- Incorporate applicable USFWS best management practices regarding Work in Aquatic Environments (USFWS 2022).
- Avoid nighttime work during the nesting (May-September) and hatching season (November-December) of sea turtles.
- Minimize the use of lighting on or near beaches and shield all project-related lights so the light is not visible from the beach/shoreline.
- Incorporate design measures into the construction or operation of buildings adjacent to the beach/shoreline to reduce ambient outdoor lighting.

6.0 References

Balazs, G.H., R.G. Forsyth, and A.K.H. Kam. 1987. Preliminary Assessment of Habitat Utilization by Hawaiian Green Turtles in their Resident Foraging Pastures. National Oceanic and Atmospheric Administration. NOAA Technical Memorandum Series NOAA-TM-NMFS-SWFC; 71. Accessed July 2024. https://repository.library.noaa.gov/view/noaa/5758.

Billerman, S.M., B.K. Keeney, P.G. Rodewald, and T.S. Schulenberg (Editors). 2022. Birds of the World. Cornell Laboratory of Ornithology, Ithaca, NY, USA. Accessed August 2024. https://birdsoftheworld.org/bow/home.

Bonaccorso, F.J., C.M. Todd, A.C. Miles, and P.M. Gorresen. 2015. Foraging Range Movements of the Endangered Hawaiian Hoary Bat, *Lasiurus cinereus semotus*. Journal of Mammalogy 96(1):64-71.

CWRM (State of Hawaii, Department of Land and Natural Resources: Commission on Water Resource Management). 2019. Water Resource Protection Plan. Prepared by Townscape, Inc. Accessed July 2024. https://files.hawaii.gov/dlnr/cwrm/planning/wrpp2019update/WRPP_ALL_201907.pdf.

CWRM. 2022. Surface water hydrologic unit boundaries for the 8 major Hawaiian Islands as of August 2022. Layer Name: Watersheds (CWRM). Accessed July 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::watersheds/explore?location=19.907608%2C-155.475058%2C8.18.

DAR (State of Hawai'i Division of Aquatic Resources). 2008. Streams (both perennial and non-perennial). Accessed August 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::streams/about.

DOFAW (State of Hawai'i, Department of Land and Natural Resources: Division of Forestry and Wildlife). 2015. Endangered Species Recovery Committee Hawaiian Hoary Bat Guidance Document.

Gaos, A.R., E.L. LaCasella, L. Kurpita, G. Balazs, S. Hargrove, C. King, H. Bernard, T.T. Jones, and P.H. Dutton. 2020. Hawaiian Hawksbills: A Distinct and Isolated Nesting Colony in the Central North Pacific Ocean Revealed by Mitochondrial DNA. Conservation Genetics, 21: 771–783. https://doi.org/10.1007/s10592-020-01287-1.

Gorresen, P.M., F.J. Bonaccorso, C.A. Pinzari, C.M. Todd, K. Montoya-Aiona, and K. Brinck. 2013. A five-year study of Hawaiian hoary bat (*Lasiurus cinereus semotus*) occupancy on the island of Hawai'i. Technical Report HCSU-041. Hawai'i Cooperative Studies Unit, University of Hawai'i at Hilo, Hilo, HI. July 2013.

Hawaii Department of Transportation (HDOT). 2007. Kahului Commercial Harbor 2030 Master Plan Draft Environmental Impact Statement. Accessed September 2024. https://hidot.hawaii.gov/harbors/harbor-users/maui-master-plans-environmental-documents/kahului-commercial-harbor-2030-master-plan-eis/.

Jacobs, D.S. 1994. Distribution and abundance of the endangered Hawaiian hoary bat, Lasiurus cinereus semotus, on the island of Hawai'i. Pacific Science. 48(2): 193-200.

Jacobs, D.S. 1999. The diet of the insectivorous Hawaiian hoary bat (Lasiurus cinereus semotus) in an open and a cluttered habitat. Canadian Journal of Zoology. 77: 1603-1608. 10.1139/z99-110.

Maui County. 2024. Maui County Wetland Overlay Map. Accessed July 2024. https://www.mauicounty.gov/2724/Wetlands-Restoration-and-Protection-Proj.

Montoya-Aiona, K., P.M. Gorresen, K.N. Courtot, A. Aguirre, F. Calderon, S. Casler, S. Ciarrachi, J. Hoeh, J.L. Tupu, and T. Zinn. 2023. Multi-scale assessment of roost selection by ʻōpeʻapeʻa, the Hawaiian hoary bat (*Lasiurus semotus*). Plos one, 18(8): e0288280.

NMFS (National Marine Fisheries Service). 2007. Recovery plan for the Hawaiian monk seal (*Monachus schauinslandi*), Revision. https://repository.library.noaa.gov/view/noaa/3521.

NOAA (National Oceanic and Atmospheric Administration). 2011. Endangered and Threatened Wildlife and Plants: Proposed Rulemaking to Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 76 (106): 32026 –32063.

NOAA. 2015. Endangered and Threatened Wildlife and Plants: Final Rulemaking to Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 80 (162): 50926–50988.

NOAA. 2023. Endangered and Threatened Wildlife and Plants: Proposed Rule To Designate Marine Critical Habitat for Six Distinct Population Segments of Green Sea Turtles. Federal Register. 88(137): 46572–46671.

NMFS (National Marine Fisheries Service). 2014. Revision of Critical Habitat for Hawaiian Monk Seals, Final Biological Report. Accessed October 2024. https://repository.library.noaa.gov/view/noaa/18684.

NRCS (Natural Resources Conservation Service). 2024. Web Soil Survey. Accessed August 2024. http://websoilsurvey.nrcs.usda.gov/.

NRCS NWCC (Natural Resources Conservation Service, National Water and Climate Center). 2024. Retrieve Climate Data and Summary Reports from AgACIS, Monthly Total Precipitation for WAILUKU AHOS 386.6. Accessed March 2025. https://www.nrcs.usda.gov/wps/portal/wcc/home/climateSupport/agAcisClimateData/.

NWS (National Weather Service). 2024a. Drought Information Statement For the Main Hawaiian Islands Valid July 12, 2024. Accessed August 2024. https://www.weather.gov/hfo/DroughtInformationStatement.

NWS. 2024b. Drought Information Statement For the Main Hawaiian Islands Valid August 16, 2024. Accessed August 2024. https://www.weather.gov/hfo/DroughtInformationStatement.

NWS 2025a. Precipitation Summaries. Accessed February 2025. https://www.weather.gov/hfo/hydro_summary.

NWS. 2025. Drought Information Statement For the Main Hawaiian Islands Valid January 10, 2025. Accessed February 2025. https://www.weather.gov/hfo/DroughtInformationStatement.

Nishida, G. 2002. Hawaiian Terrestrial Arthropod Checklist. 4th Edition. Hawai'i Biological Survey Bishop Museum.

Pinzari, C., R. Peck, T. Zinn, D. Gross, K. Montoya-Aiona, K. Brinck, M. Gorressen, and F. Bonaccorso. 2019. Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) activity, diet and prey availability at the Waihou Mitigation Area, Maui. Technical Report HCSU-090. Hawai'i Cooperative Studies Unit, University of Hawai'i at Hilo, Hilo, Hawai'i. June 2019.

Price, J. P., J. Jacobi, D., S. M. Gon (III), D. Matsuwaki, L. Mehrhoff, W. Wagner, M. Lucas, and B. Rowe. 2012. Mapping plant species ranges in the Hawai'ian Islands—Developing a methodology and associated GIS layers. U.S. Geological Survey Open-File Report 2012–1192, 34 p., one appendix (species table), 1,158 maps. http://pubs.usgs.gov/of/2012/1192/.

Robinson, J.A., J.M. Reed, J.P. Skorupa, and L.W. Oring. 2020. Black-necked Stilt (*Himantopus mexicanus*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA.

Rodríguez, A., N.D. Holmes, P.G. Ryan, K.-J. Wilson, L. Faulquier, Y. Murillo, A.F. Raine, J.F. Penniman, V. Neves, B. Rodríguez, J.J Negro, A. Chiaradia, P. Dann, T. Anderson, B. Metzger, M. Shirai, L. Deppe, J. Wheeler, P. Hodum, C. Gouveia, V. Carmo, G.P. Carreira, L. Delgado-Alburqueque, C. Guerra-Correa, F.-X. Couzi, M. Travers and M.L. Corre. 2017. Seabird mortality induced by land-based artificial lights. Conservation Biology, 31: 986-1001.

Tomich, P.Q. 1986. Mammals in Hawai'i. Bishop Museum Press, Honolulu, HI. 375 pp.

USACE (U.S. Army Corps of Engineers). Pac-Slopes BMPS. Revised: 02 March 2022. Provided to Tetra Tech by USACE on March 6, 2023.

USFWS (U.S. Fish and Wildlife Service). 1998. Recovery Plan for the Hawaiian hoary bat (*Lasiurus cinereus semotus*). U.S. Fish and Wildlife Service, Portland, OR.

USFWS. 2003. Endangered and Threatened Wildlife and Plants; designation of critical habitat for the Blackburn's sphinx moth; final rule. June 10, 2003. Federal Register 68(111):34710–34766.

USFWS. 2022. Best Management Practices for Work in or Around Aquatic Environments. Accessed August 2024. https://www.fws.gov/sites/default/files/documents/Best%20Management%20Practices%20For%20Work%20In%20or%20Around%20Aquatic%20Environment-April%202022.pdf.

USFWS. 2023a. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Green Sea Turtle. Federal Register. 88 (137): 46376- 46570.

USFWS. 2023b. Animal Avoidance and Minimization Measures. Accessed October 2023. https://www.fws.gov/sites/default/files/documents/Animal Avoidance and Minimization Measures - FINAL May 2023_0.pdf.

USFWS. 2024a. National Wetlands Inventory. Wetlands Data by State, Hawai'i. Accessed August 2024. https://www.fws.gov/node/264847.

USFWS. 2024b. Critical Habitat - Polygon Features – Final. Accessed August 2024. https://www.arcgis.com/apps/mapviewer/index.html?url=https://services.arcgis.com/QVENGdaPbd4LUkLV/ArcGIS/rest/services/USFWS_Critical_Habitat/FeatureServer&source=sd.

USGS (U.S. Geologic Survey). 2019. Ecology and Distribution of the Endangered Hawaiian Hoary Bat. Accessed July 2024. https://www.usgs.gov/pacific-island-ecosystems-research-center/science/ecology-and-distribution-endangered-hawaiian#:~:text=Distribution%20and%20seasonal%20altitudinal%20migration,appears%20to%20occur%20was%20documented.

USGS. 2023. National Hydrography Dataset. Accessed August 2024. https://www.usgs.gov/national-hydrography/access-national-hydrography-products.

Vélez-Gavilán, J. *Nicotiana glauca*. In: CABI Compendium. Wallingford, UK: CAB International. Accessed August 2024. https://www.cabidigitallibrary.org/doi/10.1079/cabicompendium.36324.

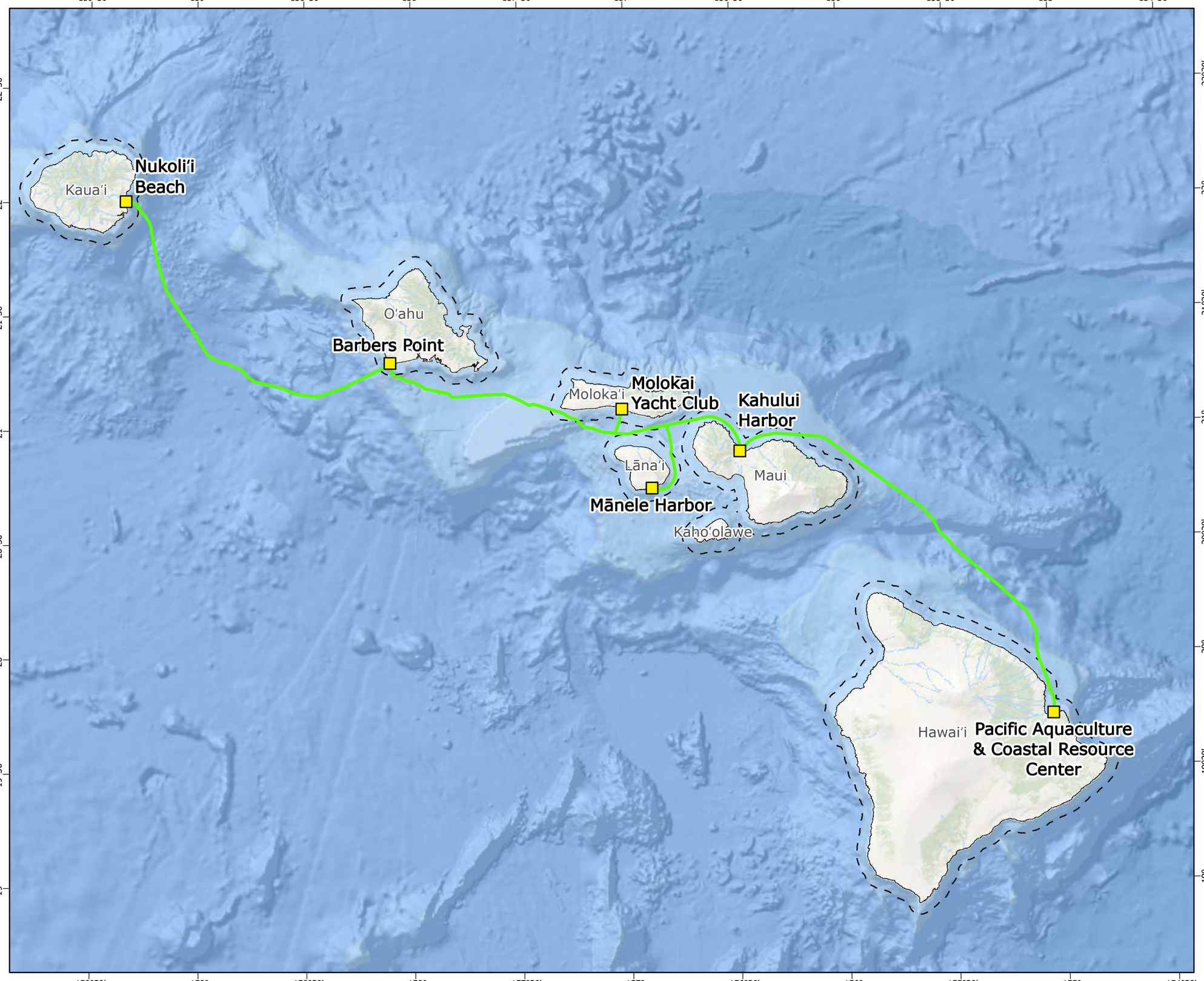
Wagner, W. L., D. R. Herbst, and D. H. Lorence. 2023. Flora of the Hawaiian Islands website. Accessed August 2024. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm.

WoRMS (World Register of Marine Species) Editorial Board. 2024. Accessed September 2024. https://www.marinespecies.org/aphia.php?p=search.

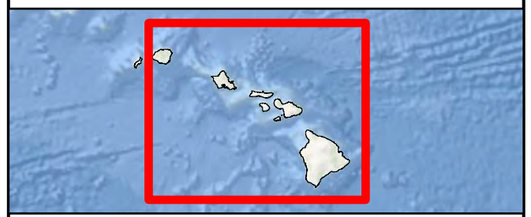
Figures

Hawaiian Islands Fiber Link

Figure 1
Project Overview



- Subsea Cable
- Cable Landing Site
- State Waters Limits (3 nautical miles)



0 20 40 80 120
Kilometers

0 10 20 40
Nautical Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\ProjectOverview_20240514\ONI_HIFL_ProjectOverview_20240801.aprx

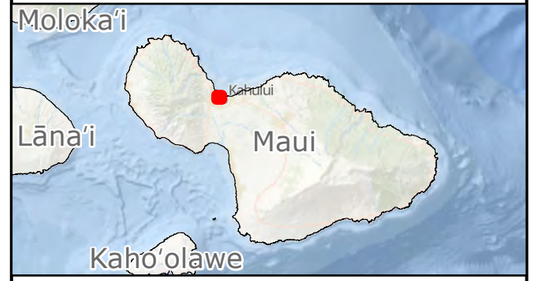
Hawaiian Islands Fiber Link Project - Maui Cable Landing Site

Figure 2
Project Study Area and Vicinity



Study Area
TMK Parcel
Highway
Roads

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.03 0.06 0.1 0.2
Miles

0 200 400 600
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_LinkMaps\BioReport_Kahului_20250318\ONI_HIFL_BioReport_Kahului_20250818.aprx

Hawaiian Islands Fiber Link Project - Maui Cable Landing Site

Figure 3
Soils Within the Study Area

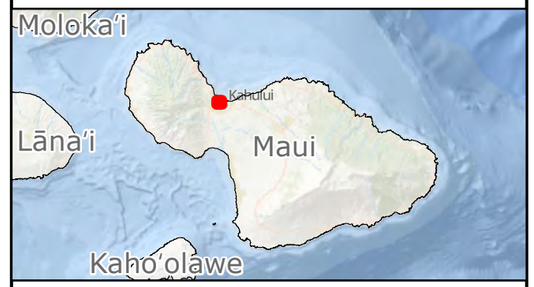


- Study Area
- Highway
- Roads

NRCS Soil Symbol

- Fd - Fill land
- PZUE - Puuone sand, 7 to 30 percent slopes
- Soil Mapping Unit Not Available

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.06 0.1 0.2
Miles

0 300 600
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Kahului_20250818\ONI_HIFL_BioReport_Kahului_20250818.aprx

Hawaiian Islands Fiber Link Project - Maui Cable Landing Site

Figure 4
Water Resources Mapped by NWI, NHD, and DAR



- Study Area
- Highway
- Roads

National Wetlands Inventory

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Riverine

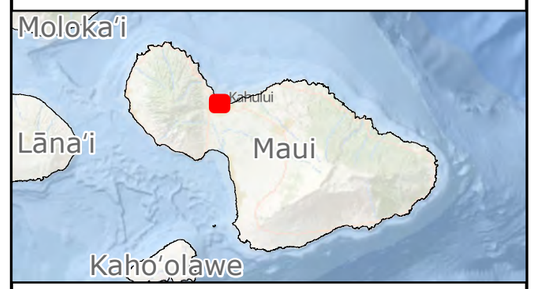
National Hydrography Dataset

- Perennial Stream
- Waterbody

Division of Aquatic Resources

- Stream

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2 0.3
Miles

0 675 1,350
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Kahului_20250818\ONI_HIFL_BioReport_Kahului_20250818.aprx

-156°29'10"
-156°28'45"
-156°28'20"
20°5'45"

HI-3400 / Kahului Beach Road
Kahului Harbor
Wahinepi'o Ave

Hawaiian Islands Fiber Link Project - Maui Cable Landing Site

Figure 5
Critical Habitat in the Vicinity of the Study Area

- Study Area
- Highway
- Roads

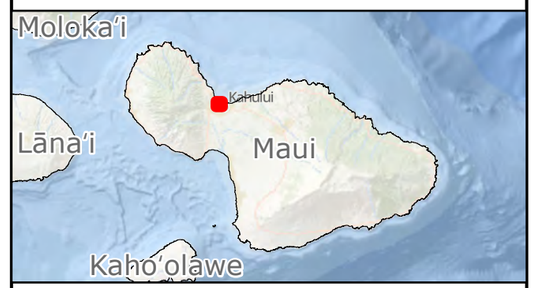
Proposed Green Sea Turtle *(Chelonia mydas)* Critical Habitat

- Marine

Monk Seal *(Neomonachus schauinslandi)* Critical Habitat

- Marine
- Terrestrial (extends from water's edge inland 16 feet past shoreline)

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.07 0.1 0.2
Miles

0 440 880
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Kahului_20250318\ONI_HIFL_BioReport_Kahului_20250818.aprx

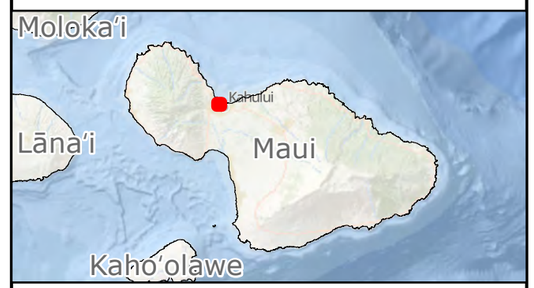
Hawaiian Islands Fiber Link Project - Maui Cable Landing Site

Figure 6
Tree Tobacco Observations



- Study Area
- Tree Tobacco*
- Highway
- Roads

*Points for tree tobacco may represent more than 1 individual.



0 0.06 0.1 0.2
Miles

0 300 600
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Kahului_20250318\ONI_HIFL_BioReport_Kahului_20250818.aprx

Appendix A

Representative Photographs of the Study Area



Photo 1. Looking southwest within west breakwater harbor area depicting low-stature coastal strand vegetation surrounded by large open areas of sand, dirt, and rocky rubble. Lat/Long: 20.898708, -156.477797. Date: July 15, 2024.



Photo 2. Coastal strand vegetation within the west breakwater harbor area portion of the Study Area including depicting the native ʻākulikuli (foreground) and non-native Indian fleabane (background). Lat/Long: 20.898805, -156.477442. Date: July 15, 2024.



Photo 3. Looking west toward Kahului Beach Road depicting ruderal vegetation. Lat/Long: 20.897246, -156.478784. Date: July 15, 2024.



Photo 4. Looking southeast along Kahului Beach Road depicting landscaping of maintained grass and coconut palms. Lat/Long: 20.896515, -156.480022. Date: July 15, 2024.



Photo 5. Looking southeast into the UH Maui Campus portion of the Study Area, depicting the Recycling Center (left) and campus infrastructure (foreground and background). Lat/Long: 20.891524, -156.482145. Date: January 20, 2025.



Photo 6. Looking south from within the UH Maui College campus, depicting landscaped areas between campus infrastructure. Lat/Long: 20.891066, -156.481407. Date: January 20, 2025.



Photo 7. Looking northwest from within the UH Maui College campus, depicting landscaped areas between campus infrastructure. Lat/Long: 20.890969, -156.481395. Date: July 15, 2024.



Photo 8. Looking north from the southern boundary of the UH Maui College campus portion of the Study Area, depicting a parking lot and landscaped areas between campus infrastructure. Lat/Long: 20.890603, -156.481481. Date: January 20, 2025.



Photo 9. Looking at endangered Hawaiian stilts in the grassy fields in the vicinity of the Study Area to the west of Kahului Beach Road. Lat/Long: 20.89493, -156.479061. Date: July 15, 2024.

Hawaiian Islands Fiber Link Project – Molokai Cable Landing Site

Biological Resources Survey Report

Prepared for:
Ocean Networks, Inc. (ONI)

Revised August 2025

TETRA TECH

complex world | CLEAR SOLUTIONS™

Table of Contents

1.0 Introduction 1
1.1 Project Description 1
2.0 Description of the Study Area 2
2.1 Climate 2
2.2 Topography and Soils 3
2.3 Surface Waters 3
2.4 Critical Habitat for Listed Species 4
3.0 Methods 4
3.1 Plants 4
3.2 Wildlife 5
3.2.1 Birds 5
3.2.2 Terrestrial Mammals 5
3.2.3 Invertebrates 5
3.2.4 Sea Turtles and Marine Mammals 6
4.0 Results and Discussion 6
4.1 Plants 6
4.2 Wildlife 9
4.2.1 Birds 9
4.2.2 Terrestrial Mammals 10
4.2.3 Invertebrates 11
4.2.4 Sea Turtles and Marine Mammals 11
5.0 Conclusions and Recommendations 12
5.1 General 12
5.2 Plants 12
5.3 Wildlife 13
5.3.1 Listed Waterbirds 13
5.3.2 Listed Seabirds 14
5.3.3 Hawaiian Hoary Bat 14

5.3.4 Sea Turtles and Marine Mammals 14
6.0 References 16

List of Tables

Table 1. Federally or State-listed Species with the Potential to Occur in the Study Area 7
Table 2. Bird Species Recorded in the Study Area and Immediate Vicinity 9
Table 3. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity 11

List of Figures

Figure 1. Project Overview
Figure 2. Project Study Area and Vicinity
Figure 3. Topography and Soils
Figure 4. Mapped Water Resources in the Study Area
Figure 5. Critical Habitat in the Vicinity of the Study Area
Figure 6. Observations of Hawaiian Stilts

List of Appendices

Appendix A. Representative Photographs of the Study Area

1.0 Introduction

The Hawaiian Islands Fiber Link (HIFL) Project is a proposed interisland submarine fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the State of Hawai‘i. The Project would interconnect the six main Hawaiian Islands, with cable landing sites on Kaua‘i, O‘ahu, Maui, Lāna‘i, Molokai, and Hawai‘i Island.

Tetra Tech was contracted to conduct a general biological survey within the 2.6-acre (1.1 hectare [ha]) terrestrial study area for the Molokai cable landing site. The purpose of the survey was to characterize the species and habitats present, and to determine whether state or federally-listed threatened or endangered species (pursuant to the federal Endangered Species Act or Hawai‘i Revised Statutes [HRS] Chapter 195D), or otherwise rare plants or animals have the potential to occur and could be impacted by construction or operation of the Project. This report summarizes the results of the biological survey conducted within the study area by Tetra Tech on October 3 and 4, 2024.

1.1 Project Description

The HIFL Project involves construction, operation, and maintenance of an interisland fiber optic cable system that would interconnect the six main Hawaiian Islands to provide more robust, diverse, and reliable broadband connectivity throughout the state. The fiber optic cable system would distribute high-speed broadband to each island, with cable landing sites strategically located on Kaua‘i (Nukoli‘i Beach), O‘ahu (Barbers Point), Maui (Kahului), Lāna‘i (Mānele Harbor), Molokai (Molokai Yacht Club), and Hawai‘i Island (Hilo). The overall extent of the HIFL Project is shown in Figure 1.

The system would include both marine and terrestrial components, with the marine component comprising approximately 416 miles (669 kilometers [km]) of fiber optic cable surface-laid on the seabed between the islands. The cable would have a maximum diameter of approximately 1.1 inches (28 millimeters [mm]) and would be installed in five distinct segments spanning the nearshore state waters and surrounding U.S. federal waters.

At the Molokai cable landing site, a single subsurface borehole would be installed using horizontal directional drilling (HDD) to allow the subsea fiber optic cable to traverse from the nearshore waters under the shoreline to the terrestrial Study Area. The terrestrial components that would be constructed within the Study Area would include a beach manhole (BMH), land-based cable (terrestrial cable), and a cable landing station (CLS). The BMH, which would be located adjacent to the yacht club facilities, would be a below-ground reinforced concrete vault (or similar) and would serve as the connection chamber between the subsea cable and the terrestrial cable. From the BMH, the terrestrial cable would be installed in underground conduit to a manhole sited next to an existing utility pole adjacent to Kamehameha V (Mauna Loa) Highway. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, including the overhead system along Kamehameha

V Highway as well as underground conduit extending into the Molokai Education Center[1]. The CLS would be a new modular structure located on the University of Hawai'i (UH) Molokai Education Center (MEC) property. The CLS would house cable operation and monitoring equipment and facilitate interconnection with the local telecommunications network.

2.0 Description of the Study Area

As shown in Figure 2, the Study Area is located in Kaunakakai on the south shore of Molokai. It encompasses 2.6-acres (1.1 ha) and is comprised of two non-contiguous areas: the cable landfall and BMH are located on land used for the Molokai Yacht Club (MYC), and the CLS is located at the UH MEC.

The MYC portion of the Study Area is located within a portion of tax map key (TMK): (2) 5-3-001:003 (por.), which is owned by the County of Maui. This portion of the Study Area includes facilities related to the yacht club, with the primary club building located just southeast of the Study Area. It is bordered by Kamehameha V Highway to the north, undeveloped wetlands and mudflats to the west, the Pacific Ocean and Kaunakakai Harbor to the south, and Aha Kukui O Molokai and the Malama Cultural Park to the east (Figure 2). Hio Place terminates at the eastern boundary of the Study Area.

The MEC portion of the Study Area is located at the UH MEC near the intersection of Kamehameha V Highway and Alanui Kaimike Street. MEC serves as the hub for higher educational teaching and learning for UH programs on Molokai (PBR Hawaii 2020). The Study Area includes portions of two tax map keys (TMK): (2) 5-3-003:014 and TMK (2) 5-3-003:013 (Figure 2), both of which are owned by UH, as well as the adjacent county rights-of-way (2) 5-3-003:999. The MEC portion of the Study Area is surrounded by undeveloped land to the west and northwest, MEC facilities and Alanui Kaimike Street to the east and northeast, and Kamehameha V Highway to the south.[2] Duke Maliu Regional Park is located roughly 400 feet (122 meters [m]) to the west of the MEC portion of the Study Area.

2.1 Climate

The climate in the Study Area is characterized as arid (Price et al. 2012). The closest functioning rainfall gage to the Study Area (Kaunakakai, located 0.5 miles [0.8 km] north of the MYC portion and 0.7 miles [1 km] northwest of the MEC portion) receives a mean annual rainfall of 14.5 inches (368 mm), with the lowest rainfall typically occurring May through September (NRCS NWCC 2024). The gage recorded below average rainfall in June, July, August, and September preceding the survey (NWS 2024a). The year-to-date total for this gage through the end of September 2024 was 88 percent of average. In September

[1] The segment of terrestrial fiber that would utilize the existing utility system is described herein to provide an overview of the entire system but is not further addressed by this study because it comprises existing third-party infrastructure.

[2] Existing buildings were not included in the survey for biological resources because the Project would not involve any new infrastructure or associated ground disturbance in the buildings.

2024, the National Weather Service determined this portion of Molokai to be in severe drought conditions (NWS 2024b), suggesting the site was dry during the survey.

2.2 Topography and Soils

The Study Area is relatively flat. At the MYC portion of the Study Area, elevations range from sea level near the shore to approximately 8 feet (2.4 m) above mean sea level at the highway. Elevations range from 2 to 7.5 feet (0.6 to 2.3 m) at the MEC portion of the Study Area.

The Natural Resources Conservation Service (NRCS) characterizes the soils within the MYC portion of the Study Area as consisting entirely of Kealia silt loam, 0 to 1 percent slopes (Figure 3; NRCS 2024). Kealia silt loam is poorly drained soil and has high salt content. Ponding occurs after heavy rains, and salt crystals accumulate on the surface when the soil dries (Foote et al. 1972). Soils within the MEC portion of the Study Area are mostly comprised of Mala silty clay, 0 to 3 percent slopes, with a small portion along the highway identified as Kealia silt loam, 0 to 1 percent slopes (Figure 3; NRCS 2024). Mala silty clay, 0 to 3 percent slopes, consists of well-drained soils on alluvial fans with an occasional frequency of flooding (NRCS 2024).

2.3 Surface Waters

The Study Area is situated within the Kaunakakai Gulch watershed which encompasses roughly 19.7 square miles (51 km^2) (Parham et al. 2008). Wetlands, streams, and other surface waters identified by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data (USFWS 2024), the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD; USGS 2023), the State of Hawai‘i Division of Aquatic Resources (DAR) dataset (DAR 2008), and the Maui County Wetland Overlay Map (Maui County 2024) are shown in Figure 4.

Within the MYC portion of the Study Area, NWI identifies a freshwater emergent wetland (Palustrine, Emergent, Persistent, Semipermanently Flooded-Tidal) within the southern portion of the site. This wetland polygon continues along the coast to the west, joining with Kaunakakai Gulch near the highway (Figure 4; USFWS 2024). Kaunakakai Gulch is located roughly 645 feet (196 m) to the west of the Study Area. The Maui County Wetland Overlay Map also identifies a large wetland immediately to the west of the Study Area (Figure 4; Maui County 2024); this wetland aligns with a wetland mitigation project conducted in the 1990s (Munekiyo & Arakawa, Inc. 1996). Per the Wetland Overlay Map and a previous wetland delineation, a small wetland is also present about 42 feet (13 m) to the east of the Study Area in the Malama Cultural Park and Aha Kukui O Molokai area (Hobdy 2008, Maui County 2024). In 2014, a wetland was also delineated along the western boundary of the Study Area, roughly corresponding to the vegetation line and extending westward into the adjacent property (AECOS 2016); however, the location of this wetland boundary has not be incorporated into any publicly available datasets or maps.

No water features are identified within the MEC portion of the Study Area. NWI, NHD, and the Maui County Wetland Overlay Map identify a wetland, known as Kōheo Wetland, roughly 200 feet (61 m) south of the MEC site, makai (southwest) of the highway. The closest stream to the MEC portion of the Study Area is Kapa‘akea Stream, located 870 feet (265 m) to the east (Figure 4).

2.4 Critical Habitat for Listed Species

Critical habitat for the endangered Hawaiian monk seal/ ʻīlio-holo-i-kauaua (*Neomonachus schauinslandi*) has been designated in the marine waters near the MYC portion of the Study Area (Figure 5). The marine portion of the monk seal critical habitat encompasses the marine waters surrounding the island out to the 656 foot (200 m) bathymetric contour (NOAA 2015). There is no terrestrial critical habitat for monk seals designated within or near the Study Area.

The National Oceanic and Atmospheric Administration (NOAA) has proposed marine critical habitat for the Central North Pacific distinct population segment of the threatened green sea turtle/ honu (*Chelonia mydas*) near the MYC portion of the Study Area (Figure 5). Proposed marine critical habitat includes all nearshore waters from the mean high water line to 65 foot (20 m) water depth (NOAA 2023a). No terrestrial critical habitat for the green sea turtle is proposed in the Study Area or along the southern Molokai shore (USFWS 2023a).

The endangered false killer whale (*Pseudorca crassidens*) also has critical habitat designated in marine waters around portions of Molokai, including marine areas roughly 1.6 miles (2.6 km) offshore of the Study Area at the 148-foot (45-m) bathymetric contour (NOAA 2023b).

No critical habitat for plants or terrestrial wildlife has been designated by the USFWS within the Study Area or the vicinity. The closest designed critical habitat for terrestrial species is 1.9 miles (3 km) northeast of the MEC portion of the Study Area.

3.0 Methods

Prior to the field survey, Tetra Tech conducted a review of relevant publicly available literature and data with respect to biological resources in and near the Study Area. This review included environmental assessments and environmental impact statements, NWI and NHD data, scientific journals and reports, the USFWS Information for Planning and Consultation (IPaC) tool, and available, unpublished data relevant to the natural history and ecology of the area. In addition, Tetra Tech reviewed available geospatial data, aerial photographs, and topographic maps of the area to identify occurrences of state or federally-listed species, or habitats that could harbor these species. The biological field survey was conducted by Tetra Tech on October 3 and 4, 2024. Details regarding the field survey methodologies are provided below.

3.1 Plants

A pedestrian survey was conducted to identify and record common plant species and dominant vegetation types, as well as rare or listed plant species within the Study Area. Areas more likely to support native plants (e.g., rocky outcrops and shady areas) were more intensively examined. Plant identifications were made in the field; plants that could not be positively identified were photo-documented for comparison with the recent taxonomic literature.

Plants recorded during this survey are indicative of the season and environmental conditions at the time of the survey. The presence and location of plants can be influenced by seasonal and temporal changes; therefore, it is possible additional species may occur within the Study Area but were not present during this survey.

The taxonomy and nomenclature of plants are in accordance with Wagner et al. (2023). Common/ Hawaiian names are provided first, followed by scientific names in parentheses. If no common or Hawaiian name is known, only the scientific name is provided.

3.2 Wildlife

The wildlife survey consisted of observations and identification of birds, terrestrial and marine mammals, and conspicuous invertebrate species encountered while searching the Study Area. Tetra Tech recorded all wildlife seen or heard while walking and driving within the Study Area coupled with visual observation of scat, tracks, and other animal sign. Habitats or plants that could support listed wildlife species were also identified if present (such as host plants for listed invertebrates or water features as potential habitat for listed Hawaiian waterbirds). Specific survey methods for each wildlife group are provided below.

3.2.1 Birds

All birds seen or heard while walking and driving within the Study Area and vicinity were recorded. Habitats or plants that could support listed birds were also identified if present (e.g., water features as potential habitat for listed Hawaiian waterbirds). Scientific nomenclature for birds follows Birds of the World (Billerman et al. 2022).

3.2.2 Terrestrial Mammals

The terrestrial mammal survey was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign while walking and driving within the Study Area. Scientific names for mammals follow Tomich (1986).

Ultrasonic bat recorders were not deployed for the endangered Hawaiian hoary bat/ ʻōpeʻapeʻa (*Lasiurus semotus*) as part of the survey. Rather, as USFWS and State of Hawaiʻi Division of Forestry and Wildlife (DOFAW) recognize all woody vegetation greater than 15 feet (4.6 m) tall as potential bat roosting habitat (DOFAW 2015, USFWS 2023b), the presence/absence of suitable bat foraging and roosting habitat within the Study Area was noted.

3.2.3 Invertebrates

Observations of large and conspicuous insects and invertebrates were recorded incidentally to wildlife and plant surveys while walking through the Study Area. Invertebrates were identified through visual observations and were not collected as specimens in the field. Scientific nomenclature for terrestrial

invertebrates follows Nishida (2002), and follows WoRMS Editorial Board (2024) for marine invertebrates.

3.2.4 Sea Turtles and Marine Mammals

This survey focused on characterizing the nearshore marine and shoreline habitat for listed sea turtles and protected marine mammals (e.g., monk seals) and was limited to visual observations from the shoreline using binoculars. Biologists scanned the nearshore marine waters and suitable nearshore terrestrial habitat for individuals or their potential habitat.

4.0 Results and Discussion

The biological resources in the Study Area have been highly modified by historic and current land uses and the introduction of invasive species, which has reduced the number and abundance of native species and habitats suitable for native species. Most of the MYC site has been previously graded and filled with imported material to raise the ground surface elevation; this site also includes U.S. Coast Guard range lights, containers, and paved or maintained areas associated with the yacht club facilities. Rubbish and various materials have been dumped mauka (northeast) of the yacht club in the area between Hio Place and the highway. The MEC portion of the Study Area is mostly characterized by infrastructure associated with the education center, including buildings and maintained landscaping. Representative photographs from the survey are presented in Appendix A.

Despite the disturbed conditions in the Study Area, the federal and state endangered Hawaiian stilt/ ae‘o (*Himantopus mexicanus knudseni*) was observed flying through the MYC portion of the Study Area during the survey, and stilts are known to regularly occur in the vicinity. Although not observed in the Study Area during the survey, several other listed animal species, including the Hawaiian hoary bat and listed seabirds, may occasionally occur in or traverse the Study Area. Listed species with the potential to occur in the Study Area are summarized in Table 1 and discussed in further detail below.

4.1 Plants

No federal or state listed threatened, endangered, proposed listed, or candidate plant species were observed in the Study Area during the biological survey. The Study Area is dominated by non-native plants. Three native plant species were observed in the Study Area, as described below. These native plant species are all indigenous and considered common throughout the Hawaiian Islands (Wagner et al. 2023).

Table 1. Federally or State-listed Species with the Potential to Occur in the Study Area

Common/Hawaiian Name(s)	Scientific Name	Listing Status[1]	Critical Habitat in Study Area	Potential Occurrence in Study Area
Birds				
Hawaiian coot/ ʻalae keʻo keʻo	*Fulica alai*	SE, FE	None Designated	Could occur in the wetland in the Study Area or wetlands to the west of MYC, and could fly over in transit to nearby suitable habitat.
Hawaiian stilt/ aeʻo	*Himantopus mexicanus knudseni*	SE, FE	None Designated	Could occur or nest in the wetland in the Study Area or wetlands to the west of MYC, and could fly over MYC or MEC in transit to nearby suitable habitat.
Hawaiian petrel/ ʻuaʻu	*Pterodroma sandwichensis*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Newell's shearwater/ ʻaʻo	*Puffinus auricularis newelli*	ST, FT	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Band-rumped storm-petrel/ ʻakēʻakē	*Hydrobates castro*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Terrestrial Mammals				
Hawaiian hoary bat/ ʻōpeʻapeʻa	*Lasiurus semotus*	SE, FE	None Designated	Could traverse or forage in the Study Area or roost in vegetation > 15 feet in height.
Sea Turtles and Marine Mammals				
Green sea turtle/ honu	*Chelonia mydas*	ST, FT	Proposed marine in immediate vicinity	Not known to nest in or near the Study Area, but could forage offshore.
Hawaiian monk seal/ ʻīlio-holo-i-kauaua	*Neomonachus schauinslandi*	SE, FE	Designated marine in immediate vicinity	Unlikely to haul out in Study Area, but could haul out in the vicinity or forage offshore.

1. FE = Federally endangered; SE = State endangered; FT = Federally threatened; ST = State threatened.

MYC Portion of the Study Area

Large portions of the MYC section of the Study Area are unvegetated, with exposed bare ground (Appendix A, Photos 1 – 3). Vegetation in this portion of the Study Area is characterized by two main vegetation types: Pickleweed Marsh and Ruderal Vegetation.

Pickleweed Marsh: The Pickleweed Marsh consists of dense mats of non-native pickleweed (*Batis maritima*). No other plant species occur within this vegetation type, but red mangrove (*Rhizophora mangle*) and kiawe (*Neltuma pallida*) trees are present within the pickleweed just to the west of the Study Area. This vegetation type occurs along the southwestern portion of the Study Area, along the western boundary, and along the shoreline (Appendix A, Photos 4 – 5).

Ruderal Vegetation: Ruderal Vegetation is dominated by a mixture of non-native grasses and low-growing herbaceous weeds and shrubs. This vegetation type occurs between Hio Place and the highway and in small areas around the yacht club facilities. It is comprised of patches of non-native Bermuda grass (*Cynodon dactylon*), Australian saltbush (*Atriplex semibaccata*), marsh fleabane (*Pluchea indica*), pickleweed, fingergrass (*Chloris barbata*), buffelgrass (*Cenchrus ciliaris*), and *Sesuvium verrucosum* (Appendix A, Photo 6). Scattered individuals of the native kīpūkai (*Heliotropium curassavicum*) are also present in this vegetation type.

MEC Portion of the Study Area

Two vegetation types occur in the MEC portion of the Study Area: Landscaped Areas and Cut Mixed Non-Native Vegetation.

Landscaped Areas: Landscaped Areas at the MEC are dominated by open, maintained lawns with ornamental species planted around the buildings (Appendix A, Photos 7 – 8). The lawn is mostly composed of wide-leaved carpetgrass (*Axonopus compressus*) and creeping indigo (*Indigofera spicata*). Two native plant species, kou (*Cordia subcordata*) trees and naupaka kahakai (*Scaevola taccada*), are planted around the buildings. Kukui (*Aleurites moluccana*) trees, kalo (*Colocasia esculenta*), and kī/ ti (*Cordyline fruticosa*), which are Polynesian-introduced species, are also planted in the area.

Cut Mixed Non-Native Vegetation: In the western section of the MEC site, a mixture of recently-cut non-native plants species are present. At the time of the survey, the vegetation was less than 4 inches (100 mm). Non-native species identified in this area include buffelgrass, koa hoale (*Leucaena leucocephala* subsp. *leucocephala*), kiawe, Guinea grass (*Megathyrsus maximus*), spiny amaranth (*Amaranthus spinosus*), sourgrass (*Digitaria insularis*), sourbush (*Pluchea carolinensis*), Australian saltbush, and scarlet boerhavia (*Boerhavia coccinea*) (Appendix A, Photo 9). The native kīpūkai is also scattered throughout the cut vegetation. A review of Google Earth imagery from 2021/2022 shows the western section previously had dense tree cover, while imagery from 2014 and 2018 show sparse vegetation in the area (Google Earth Pro 2025).

4.2 Wildlife

4.2.1 Birds

Thirteen bird species were recorded within the Study Area and immediate vicinity during the survey (Table 2). One listed bird species, the endangered Hawaiian stilt, was observed flying through the MYC portion of the Study Area and using the wetland area immediately west of the Study Area. Listed bird species that have the potential to occur in or traverse the Study Area are discussed in more detail below. Three other native bird species—black-crowned night heron/ auku‘u (*Nycticorax nycticorax*), Pacific golden plover/ kōlea (*Pluvialis fulva*), and ruddy turnstone/ ‘akekeke (*Arenaria interpres*)—were also recorded in the Study Area; these three native bird species are protected by the Migratory Bird Treaty Act (MBTA).

The remaining species in Table 2 are non-native and commonly found in urban, rural, or agricultural areas. The most common bird species recorded during the survey were the zebra dove (*Geopelia striata*), cattle egret (*Bubulcus ibis*), and common myna (*Acridotheres tristis*).

Table 2. Bird Species Recorded in the Study Area and Immediate Vicinity

Common/ Hawaiian Name	Scientific Name	Status	MYC	MEC
Black-crowned night heron/ auku‘u	*Nycticorax nycticorax* [1]	I	✓	
Cattle egret	*Bubulcus ibis* [1]	NN	✓	✓
Common myna	*Acridotheres tristis*	NN	✓	✓
Hawaiian stilt/ ae‘o	*Himantopus mexicanus knudseni* [2]	E	✓	
House finch	*Haemorhous mexicanus* [1]	NN	✓	✓
House sparrow	*Passer domesticus*	NN	✓	
Java sparrow	*Padda oryzivora*	NN		✓
Northern cardinal	*Cardinalis cardinalis* [1]	NN	✓	
Pacific golden-plover/ kōlea	*Pluvialis fulva*[1]	M	✓	
Red junglefowl	*Gallus gallus*	NN	✓	✓
Ruddy turnstone/ ‘akekeke	*Arenaria interpres* [1]	M	✓	
Spotted dove	*Spilopelia chinensis*	NN	✓	
Zebra dove	*Geopelia striata*	NN	✓	✓

Status: = Endemic, I = Indigenous, M = Migrant, NN = Non-native established species.

1. MBTA = Protected by the Migratory Bird Treaty Act.

2. Listed as federally and state endangered.

No native birds were observed at the MEC portion of the Study Area during the survey; however, the bristle-thighed curlew/ kioea (*Numenius tahitiensis*) has been previously reported to use the parking lot and lawn in the vicinity of the MEC (PBR Hawaii 2020).

Listed Waterbirds: The wetland within the MYC portion of the Study Area and wetlands to the west are suitable habitat for listed waterbirds. At least three Hawaiian stilt individuals were observed loafing in the wetland area about 35 feet (11 m) west of the MYC portion of the Study Area (Figure 6; Appendix A, Photos 10 – 11). Two of the stilt individuals flew over the makai portion of the Study Area from the western wetland. These individuals were vocalizing and displaying territorial behavior. Hawaiian stilts typically forage in a variety of fresh to saline wetlands and along shallow ponds, mudflats, salt ponds, rice and taro fields, and impoundments. Hawaiian stilts nest in exposed mudflats, shallow freshwater or brackish wetlands, or other low-lying areas with sparse vegetation cover (Robinson et. al 2020, USFWS 2020). Therefore, it is likely stilts could regularly forage and possibly nest within the wetland in the Study Area or immediately west of the Study Area. Hawaiian stilts may also occasionally occur in other portions of the Study Area wherever ephemeral or persistent standing water is present.

The endangered Hawaiian coot/ ʻalae keʻokeʻo (*Fulica alai*) was not observed during the survey, and has not been previously recorded in the immediate vicinity (AECOS 2016, ebird 2021, G70 2021). However, Hawaiian coots have been previously recorded at the Kaunakakai Water Treatment Plant to the west of the MYC and at Kōheo Wetland to the south of MEC (ebird 2021). Hawaiian coots could occasionally occur within the wetland at the MYC or fly over the Study Area while traveling between areas of suitable habitat outside of the Study Area. Due to changing water levels and lack of regular occurrence, Hawaiian coots are less likely to nest in the wetland within the Study Area compared to stilts.

Listed Seabirds: The endangered Hawaiian petrel/ ʻuaʻu (*Pterodroma sandwichensis*), threatened Newell's shearwater/ ʻaʻo (*Puffinus newelli*), and endangered band-rumped storm-petrel/ ʻakēʻakē (*Hydrobates castro*) (collectively referred to as listed seabirds) have not been documented in the Study Area, and suitable nesting habitat does not occur in the Study Area or vicinity; however, these listed seabirds have the potential to fly over the Study Area at night between March and December while transiting between nesting sites and the ocean. These listed seabirds are known to be attracted to outdoor lighting at night; after circling the lights, they can become exhausted and collide with nearby structures or fall to the ground (USFWS 2023b).

4.2.2 Terrestrial Mammals

Several dogs were seen in the MYC portion of the Study Area and the scat and tracks of feral cats (*Felis catus*) were also identified. A feral cat was seen at the MEC site. Although not directly observed, other introduced mammals, such as small Indian mongoose (*Herpestes auropunctatus*), feral pigs (*sus scrofa*), house mice (*Mus musculus*), and rats (*Rattus* spp.), are likely to occur within the Study Area.

Recent studies have found that Hawaiʻi's only native, extant terrestrial mammal—the endangered Hawaiian hoary bat—is more abundant across the Hawaiian Islands than previously understood (Gorresen et al. 2013, Bonaccorso et al. 2015, USGS 2019). Hawaiian hoary bats will forage in open and

semi-cluttered landscapes in a wide range of habitats and vegetation types such as in open areas, at forest edges or within gaps, and over open water bodies including streams, ponds, and along shorelines (Jacobs 1994, Jacobs 1999, Bonaccorso et al. 2015, Pinzari et al. 2019). Hawaiian hoary bats are tree-roosting bats and roost in various native and non-native trees (USFWS 1998, Gorresen et al. 2013, Montoya-Aiona et al. 2023). Acoustic bat monitoring that occurred at nearby Kaunakakai Armor reported relatively low frequency of bat detection (Montoya-Aiona et al. 2020). Regardless, large trees within the MEC portion of the Study Area (e.g., kukui) are over 15 feet (4.6 m) tall and have the potential to function as bat roost trees. Thus, Hawaiian hoary bats may transit, roost, or forage in portions of the Study Area.

4.2.3 Invertebrates

Invertebrates incidentally observed during the survey are listed in Table 3. No native invertebrates were observed within the Study Area during the survey.

Table 3. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity

Common/ Hawaiian Name	Scientific Name	Status	MYC	MEC
Ants	Formicidae*	NN	✓	
Garden spider	*Argiope appensa*	NN	✓	
Mangrove crab	*Scylla serrata*	NN	✓	
Pill bug	Isopoda*	NN	✓	
Western honeybee	*Apis mellifera*	NN	✓	✓

NN = non-native species.
* = Represents order or family because lower taxonomic identification could not be made in the field.

4.2.4 Sea Turtles and Marine Mammals

No sea turtles, monk seals, or other marine mammals were observed in the Study Area or immediate marine area during the survey. Hawaiian monk seals spend most of their time in the ocean, but also haul out on land for resting, pupping, nursing, molting, and avoiding predators. Monk seals primarily haul out on sandy beaches, but also utilize coral rubble, rocky, and volcanic substrates (NMFS 2007, NOAA 2011). While the shoreline adjacent to the MYC portion of the Study Area has the physical characteristics to provide habitat for monk seals, Kaunakakai shoreline is not considered a significant haul out or pupping area for monk seals (NMFS 2014).

In Hawai‘i, green sea turtles mostly nest on sandy beaches close to where they were hatched (NOAA 2023b). Although there is a sandy beach along the shoreline, green sea turtles are not known to nest in the Study Area or vicinity. Green sea turtles often forage in shallow reefs throughout the main Hawaiian Islands where their food source is plentiful (Balazs et al. 1987). No green sea turtles were observed from the shoreline during Tetra Tech’s survey; however, a recent marine survey found that green sea turtles are very common in Kaunakakai Harbor (Raynal et al. 2021); therefore, it is likely green sea turtles could forage in the marine area adjacent to the Study Area.

The endangered hawksbill sea turtle (*Eretmochelys imbricata*) is a rare sea turtle species that uses similar feeding grounds to the green sea turtle (Gaos et. al. 2020) and nests on a wide range of substrates (USFWS 2023b). Hawksbill sea turtles are only known to nest on the easternmost portion of Molokai (Gaos et. al. 2021), but they have the potential to forage in the marine waters in the vicinity of the Study Area.

5.0 Conclusions and Recommendations

As described in Section 4, the majority of the plants and animals observed in the Study Area are non-native to the Hawaiian Islands. One federal and state listed species—the Hawaiian stilt—was observed in the Study Area during the biological survey. Although not observed, several other listed wildlife species have the potential to occasionally occur in or transit through the Study Area, including the Hawaiian coot, Hawaiian hoary bat, and listed seabirds. Recommended measures to avoid and minimize impacts to these species are outlined below.

5.1 General

In addition to the species-specific measures detailed below, Tetra Tech recommends the following general measures to avoid and minimize impacts to biological resources:

- Although non-native weedy species are common in the Study Area, invasive species minimization measures should be implemented to avoid unintentional introduction or transport of new invasive species to the area. This includes utilizing on-site gravel, rock, and soil (or purchasing from a local supplier) when practicable; utilizing certified, weed-free seed mixes; and washing construction equipment and/or visually inspecting for excessive debris, plant materials, and invasive or harmful non-native species as appropriate.
- Establish an environmental education and observation program for all construction and operational personnel. Staff should be trained to identify listed wildlife or MBTA-protected birds that may be found on-site (particularly the Hawaiian stilt) and to take appropriate steps if listed wildlife species are found.
- If any downed listed wildlife species are observed at the Project, USFWS and DOFAW should be notified as soon as possible.

5.2 Plants

No listed or rare native plant species were observed in the Study Area during the survey. The vegetation in the Study Area is highly disturbed from previous land use activities, and only three native plant species were observed, all of which commonly occur throughout Hawai‘i. Tetra Tech recommends the following with regards to plants:

- If landscaping is installed as part of the Project, use non-invasive plants and incorporate native plant species to the maximum extent practicable.

5.3 Wildlife

Nearly all the animal species recorded in the Study Area are not native to the Hawaiian Islands. Only four native animal species were recorded – the endangered Hawaiian stilt and three indigenous/migratory bird species. In general, the habitat in the Study Area is not suitable for listed wildlife. However, listed waterbirds are likely to occur within the wetland in the southwestern portion of the Study Area and immediately west of the MYC portion of the Study Area. Hawaiian hoary bats and listed seabirds have the potential to occasionally occur in or transit the Study Area.

5.3.1 Listed Waterbirds

The Hawaiian stilt was detected flying over the MYC portion of the Study Area, and this species is known to regularly occur immediately west of the Study Area. Hawaiian stilts could forage or nest within the wetland in the Study Area or adjacent wetlands. They could also fly over the Study Area or potentially utilize other portions of the Study Area if standing water is present. To avoid impacts to the Hawaiian stilt (and Hawaiian coot) during Project construction and operation, Tetra Tech recommends the following based on avoidance and minimization measures provided by USFWS (2023b) and DOFAW:

- Avoid creating areas with standing water.
- Post and implement reduced speed limits, and inform project personnel and contractors about the presence of endangered species on-site.
- Prior to project initiation, have a qualified biologist conduct Hawaiian waterbird nest surveys where appropriate habitat occurs within the vicinity of the Project Area. Nest surveys should be conducted within 3 days before any work is conducted and after any subsequent delay of work of 3 or more days (during which the birds may attempt to nest). If a nest or active brood is found:
    - Contact USFWS and DOFAW within 48 hours.
    - Establish and maintain a 100-foot (30 m) buffer around all active nests and/or broods until the chicks/ducklings have fledged. Do not conduct potentially disruptive activities or habitat alteration within this buffer.
    - Have a biological monitor that is familiar with the species' biology present on the project site during all construction or earth moving activities until the chicks/ducklings fledge to ensure that Hawaiian waterbirds and nests are not adversely impacted.
- If listed waterbirds are found in the Study Area during active construction, cease all activities within 100 feet (30 m) of the bird(s), and do not approach the bird(s). Work may continue after the bird leaves the area of its own accord. Consider using a qualified biological monitor during active construction to maintain the 100-foot buffer from all listed waterbirds.

5.3.2 Listed Seabirds

The Study Area does not provide suitable nesting or foraging habitat for the three listed seabirds. However, individuals may fly over the area during the breeding, nesting, and fledging seasons (March 1 - December 15) and may be attracted to nighttime lighting. Disorientation and fallout as a result of light attraction could occur for individuals attracted to unshielded nighttime lighting. Juvenile birds are particularly vulnerable to light attraction, and grounded birds are vulnerable to mammalian predators or vehicle strikes (Rodríguez et al. 2017). Tetra Tech recommends the following measures to avoid and minimize potential impacts to listed seabirds:

- If operational on-site lighting is required, it should consist of fixtures that will be shielded and/or directed downward to prevent upward radiation, triggered by a motion detector, and fitted with non-white light bulbs to the extent possible.
- Avoid the use of nighttime lighting that could attract seabirds during the seabird peak fallout period (September 15 - December 15).
- If a grounded seabird is found at the Project, notify USFWS and DOFAW immediately. These agencies may recommend contacting the Maui Nui Seabird Recovery Project at (808) 573-2473.
- Minimize construction of overhead lines to reduce the collision risk for seabird species.

5.3.3 Hawaiian Hoary Bat

Direct impacts to bats could occur if roost trees are disturbed or through the use of barbed wire. Tetra Tech recommends the following avoidance measures provided by USFWS (2023b):

- To prevent entanglements, do not use barbed wire for fencing.
- Do not trim, disturb, or remove woody vegetation taller than 15 feet (4.6 m) between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

5.3.4 Sea Turtles and Marine Mammals

No sea turtles or marine mammals were detected within the Study Area during the survey. However, green sea turtles have been recorded in the nearby harbor and hawksbill sea turtles have the potential to forage in the nearshore waters in the vicinity of the Study Area. Although unlikely, monk seals could occasional haul out along the shoreline or occur in the nearshore waters. Tetra Tech recommends following the Standard Local Operating Procedures for Endangered Species in the Central and Western Pacific Region (Pac-SLOPES) provided by U.S. Army Corps of Engineers (USACE 2022) to minimize impacts to ESA-listed marine species (sea turtles, marine mammals, sharks, rays) and their habitats. Tetra Tech also recommends the following avoidance measures adapted from USFWS (2023b):

- Do not use vehicles on or modify the beach area during the sea turtle nesting or hatching season (May through December).

- Have a biologist (or qualified, trained individual) familiar with sea turtles and monk seals conduct a visual survey of the project site immediately prior to work to ensure no sea turtles or monk seals are present. If these species are found within the project area, cease all mechanical or construction activities within 100 feet (30 m) until the animal voluntarily leaves the area.
- Remove any project-related debris, trash, or equipment from the beach/shoreline area if not actively being used.
- Do not stockpile project-related materials in the intertidal zone, reef flats, and adjacent vegetated areas.
- Incorporate applicable USFWS best management practices regarding Work in Aquatic Environments (USFWS 2022).
- Avoid nighttime work during the nesting (May-September) and hatching season (November-December) of sea turtles.
- Minimize the use of lighting on or near beaches and shield all project-related lights so the light is not visible from the beach/shoreline.
- Incorporate design measures into the construction or operation of buildings adjacent to the beach/shoreline to reduce ambient outdoor lighting.

6.0 References

AECOS. 2016. Wetlands Delineation on TMK (2) 5-3:001:003 & 008 and (2) 5-3-005:006 for Drainage System "B" Improvement, Kaunakakai, Molokai.

Balazs, G.H., R.G. Forsyth, and A.K.H. Kam. 1987. Preliminary Assessment of Habitat Utilization by Hawaiian Green Turtles in their Resident Foraging Pastures. National Oceanic and Atmospheric Administration. NOAA Technical Memorandum Series NOAA-TM-NMFS-SWFC; 71. Accessed July 2024. https://repository.library.noaa.gov/view/noaa/5758.

Billerman, S.M., B.K. Keeney, P.G. Rodewald, and T.S. Schulenberg (Editors). 2022. Birds of the World. Cornell Laboratory of Ornithology, Ithaca, NY, USA. Accessed August 2024. https://birdsoftheworld.org/bow/home.

Bonaccorso, F.J., C.M. Todd, A.C. Miles, and P.M. Gorresen. 2015. Foraging Range Movements of the Endangered Hawaiian Hoary Bat, *Lasiurus cinereus semotus*. Journal of Mammalogy 96(1):64-71.

DAR (State of Hawai'i Division of Aquatic Resources). 2008. Streams (both perennial and non-perennial). Accessed August 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::streams/about.

DOFAW (State of Hawai'i, Department of Land and Natural Resources: Division of Forestry and Wildlife). 2015. Endangered Species Recovery Committee Hawaiian Hoary Bat Guidance Document.

eBird. 2021. eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York. Accessed November 2024. http://www.ebird.org.

Foote, D.E., E.L. Hill, S. Nakamura, and F. Stephens. 1972. Soil Survey of the Islands of Kaua'i, O'ahu, Maui, Moloka'i, and Lana'i, State of Hawai'i. U.S. Department of Agriculture, Soil Conservation Service.

G70. 2021. Biological Survey and Assessment for the Malama Cultural Park.

Gaos, A.R., E.L. LaCasella, L. Kurpita, G. Balazs, S. Hargrove, C. King, H. Bernard, T.T Jones, and P.H. Dutton. 2020. Hawaiian hawksbills: a distinct and isolated nesting colony in the Central North Pacific Ocean revealed by mitochondrial DNA. Conservation Genetics 21: 771-783.

Gaos A.R., L. Kurpita, H. Bernard, L. Sundquist, C.S. King, J.H. Browning, E. Naboa, I.K. Kelly, K. Downs, T. Eguchi, G. Balazs, K. van Houtan, D. Johnson, T.T. Jones, S.L. Martin. 2021. Hawksbill Nesting in Hawai'i: 30-Year Dataset Reveals Recent Positive Trend for a Small, Yet Vital Population. Frontiers in Marine Science, 8. https://doi.org/10.3389/fmars.2021.770424.

Google Earth Pro. 2025. (v7.3.6). Kaunakakai. Google Earth imagery. Accessed March 2025.

Gorresen, P.M., F.J. Bonaccorso, C. A. Pinzari, C.M. Todd, K. Montoya-Aiona, and K. Brinck. 2013. A five-year study of Hawaiian hoary bat (*Lasiurus cinereus semotus*) occupancy on the island of Hawai'i. Technical Report HCSU-041. Hawai'i Cooperative Studies Unit, University of Hawai'i at Hilo, Hilo, HI. July 2013.

Hobdy, R.W. 2008. Wetland Determination for the Malama Cultural Park, Kaunakakai, Molokai.

Jacobs, D.S. 1994. Distribution and abundance of the endangered Hawaiian hoary bat, *Lasiurus cinereus semotus*, on the island of Hawai'i. Pacific Science. 48(2): 193-200.

Jacobs, D.S. 1999. The diet of the insectivorous Hawaiian hoary bat (*Lasiurus cinereus semotus*) in an open and a cluttered habitat. Canadian Journal of Zoology. 77: 1603-1608. 10.1139/z99-110.

Maui County. 2024. Maui County Wetland Overlay Map. Accessed July 2024. https://www.mauicounty.gov/2724/Wetlands-Restoration-and-Protection-Proj.

Montoya-Aiona, K.M., C.A. Pinzari, R.W. Peck, K.W. Brinck, and F.J. Bonaccorso. 2020. Hawaii Army National Guard (HIARNG) Hawaiian Hoary Bat Acoustic Long Term Data 2012-2018. Technical Report HCSU-092.

Montoya-Aiona, K., P.M. Gorresen, K.N. Courtot, A. Aguirre, F. Calderon, S. Casler, S. Ciarrachi, J. Hoeh, J.L. Tupu, and T. Zinn. 2023. Multi-scale assessment of roost selection by 'ōpe'ape'a, the Hawaiian hoary bat (*Lasiurus semotus*). Plos one, 18(8): e0288280.

Munekiyo & Arakawa, Inc. 1996. Kaunakakai Wetlands Mitigation Plan and Final Environmental Assessment. Prepared for Molokai Ranch, Limited.

Nishida, G. 2002. Hawaiian Terrestrial Arthropod Checklist. 4th Edition. Hawaii Biological Survey Bishop Museum.

NMFS (National Marine Fisheries Service). 2007. Recovery plan for the Hawaiian monk seal (*Monachus schauinslandi*), Revision. Accessed December 2024. https://repository.library.noaa.gov/view/noaa/3521.

NMFS. 2014. Revision of Critical Habitat for Hawaiian Monk Seals, Final Biological Report. Accessed October 2024. https://repository.library.noaa.gov/view/noaa/18684.

NOAA (National Oceanic and Atmospheric Administration). 2011. Endangered and Threatened Wildlife and Plants: Proposed Rulemaking to Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 76 (106): 32026 –32063.

NOAA. 2015. Endangered and Threatened Species: Final Rulemaking To Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 80 (162): 50926-50988.

NOAA. 2023a. Endangered and Threatened Wildlife and Plants: Proposed Rule To Designate Marine Critical Habitat for Six Distinct Population Segments of Green Sea Turtles. Federal Register. 88(137): 46572–46671.

NOAA. 2023b. National ESA Critical Habitat Mapper (v1.0) by the National Marine Fisheries Service. Accessed August 2024. https://www.fisheries.noaa.gov/resource/map/national-esa-critical-habitat-mapper.

NRCS (Natural Resources Conservation Service). 2024. Web Soil Survey. Accessed August 2024. http://websoilsurvey.nrcs.usda.gov/.

NRCS NWCC (Natural Resources Conservation Service, National Water and Climate Center). 2024. Retrieve Climate Data and Summary Reports from AgACIS. Accessed November 2024. https://www.nrcs.usda.gov/wps/portal/wcc/home/climateSupport/agAcisClimateData/.

NWS (National Weather Service). 2024a. Precipitation Summaries. Accessed October 25, 2024. https://www.weather.gov/hfo/hydro_summary.

NWS. 2024b. National Weather Service Honolulu, HI, Drought Information Statement for the Main Hawaiian Islands valid September 13, 2024. Accessed October 24, 2024. https://www.weather.gov/media/hfo/DGT/DGT_HFO_09132024.pdf.

Parham, J.E., G.R. Higashi, D.G.K. Kuamoʻo, R.T. Nishimoto, S. Hau, J.M. Fitzsimons, D.A. Polhemus, and W.S. Devick. 2008. Atlas of Hawaiian Watersheds and Their Aquatic Resources. Prepared for the State of Hawaiʻi Department of Land and Natural Resources Division of Aquatic Resources. Accessed July 2023. http://hawaiiwatershedatlas.com/index.html.

PBR Hawaii. 2020. Molokai Education Center Expansion, Final Environmental Assessment. Prepared for University of Hawaiʻi.

Pinzari, C., R. Peck, T. Zinn, D. Gross, K. Montoya-Aiona, K. Brinck, M. Gorressen, and F. Bonaccorso. 2019. Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) activity, diet and prey availability at the Waihou Mitigation Area, Maui. Technical Report HCSU-090. Hawaiʻi Cooperative Studies Unit, University of Hawaiʻi at Hilo, Hilo, Hawaiʻi. June 2019.

Price, J. P., Jacobi, J. D., Gon, S. M. III, Matsuwaki, D., Mehrhoff, L., Wagner, W., Lucas, M., and Rowe, B. 2012. Mapping plant species ranges in the Hawaiian Islands—Developing a methodology and associated GIS layers. U.S. Geological Survey Open-File Report 2012–1192, 34 p., one appendix (species table), 1,158 maps. http://pubs.usgs.gov/of/2012/1192/.

Raynal, J., A. Montgomery, and N. Sukhraj. 2021. Phase I and II Marine Habitat Characterization Kaunakakai Harbor, Molokai, Hawaii, Maintenance Dredging. Prepared for the U.S. Army Corps of Engineers.

Robinson, J.A., J.M. Reed, J.P. Skorupa, and L.W. Oring. 2020. Black-necked Stilt (*Himantopus mexicanus*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA.

Rodríguez, A., N.D. Holmes, P.G. Ryan, K.-J. Wilson, L. Faulquier, Y. Murillo, A.F. Raine, J.F. Penniman, V. Neves, B. Rodríguez, J.J Negro, A. Chiaradia, P. Dann, T. Anderson, B. Metzger, M. Shirai, L. Deppe, J. Wheeler, P. Hodum, C. Gouveia, V. Carmo, G.P. Carreira, L. Delgado-Alburqueque, C. Guerra-Correa, F.-X. Couzi, M. Travers and M.L. Corre. 2017. Seabird mortality induced by land-based artificial lights. Conservation Biology, 31: 986-1001.

Tomich, P.Q. 1986. Mammals in Hawaii. Bishop Museum Press, Honolulu, HI. 375 pp.

USACE (U.S. Army Corps of Engineers). 2022. Pac-SLOPES BMPs. Revised 02 March 2022.

USFWS (U.S. Fish and Wildlife Service). 1998. Recovery Plan for the Hawaiian hoary bat (*Lasiurus cinereus semotus*). U.S. Fish and Wildlife Service, Portland, OR.

USFWS. 2020. 5-Year Status Review. Aeʻo or Hawaiian stilt (*Himantopus mexicanus knudseni*). Accessed November 2024. https://ecos.fws.gov/docs/five_year_review/doc6471.pdf.

USFWS. 2022. Best Management Practices for Work in or Around Aquatic Environments. Accessed July 2024. https://www.fws.gov/sites/default/files/documents/Best%20Management%20Practices%20For%20Work%20In%20or%20Around%20Aquatic%20Environment-April%202022.pdf.

USFWS. 2023a. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Green Sea Turtle. Federal Register. 88 (137): 46376- 46570.

USFWS. 2023b. Animal Avoidance and Minimization Measures. Accessed August 2024. https://www.fws.gov/sites/default/files/documents/Animal Avoidance and Minimization Measures - FINAL May 2023_0.pdf.

USFWS. 2024. National Wetlands Inventory. Wetlands Data by State, Hawaiʻi (Dated October 27, 2024. Accessed November 2024. https://www.fws.gov/node/264847.

USGS (U.S. Geologic Survey). 2019. Ecology and Distribution of the Endangered Hawaiian Hoary Bat. Accessed July 2024. https://www.usgs.gov/pacific-island-ecosystems-researchcenter/science/ecology-and-distribution-endangeredhawaiian#:~:text=Distribution%20and%20seasonal%20altitudinal%20migration,appears%20to%20occur%20was%20documented.

USGS. 2023. National Hydrography Dataset. Accessed August 2024. https://www.usgs.gov/national-hydrography/access-national-hydrography-products.

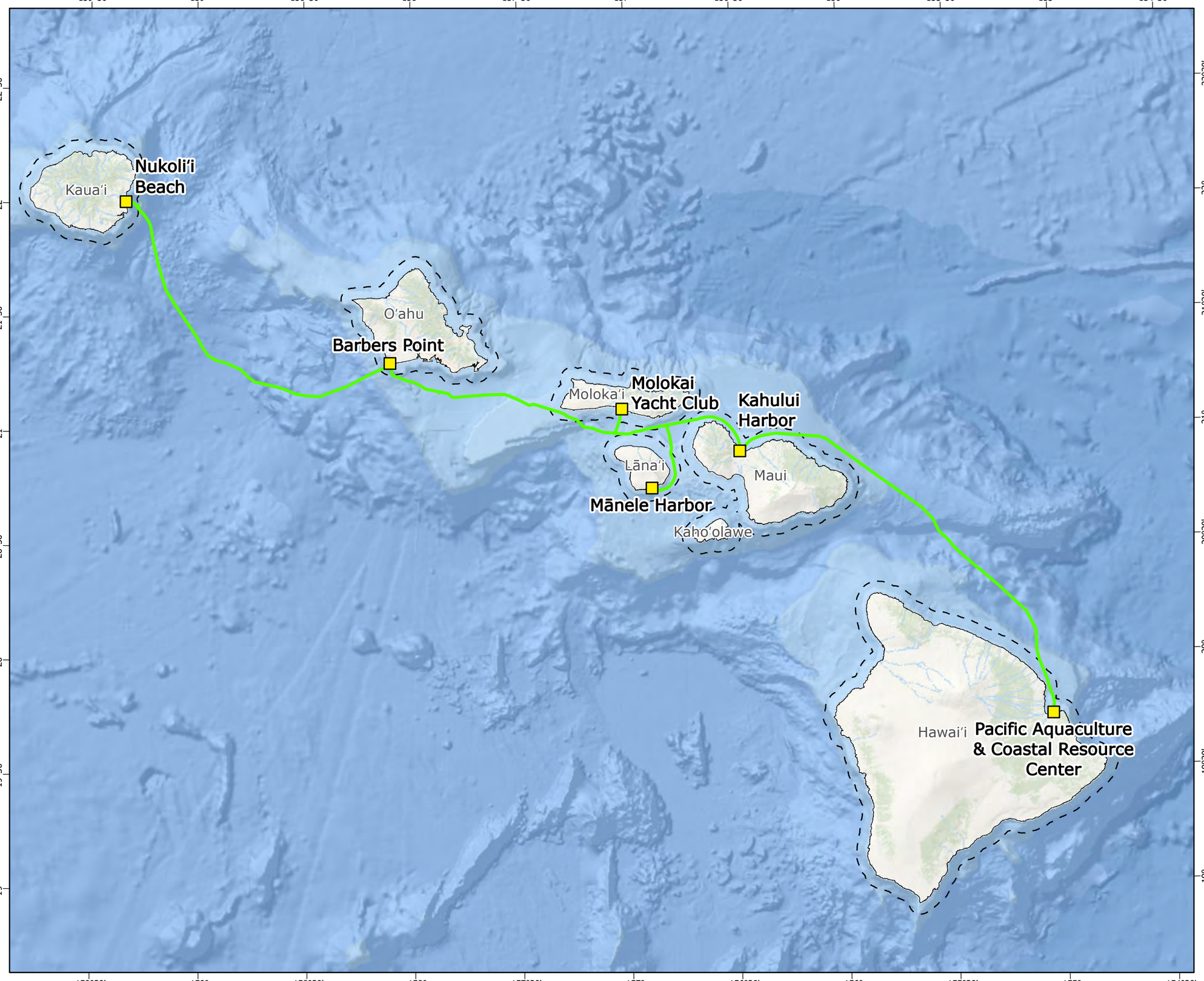
Wagner, W. L., D. R. Herbst, and D. H. Lorence. 2023. Flora of the Hawaiian Islands website. Accessed August 2024. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm.

WoRMS (World Register of Marine Species) Editorial Board. 2024. Accessed October 2024. https://www.marinespecies.org/aphia.php?p=search.

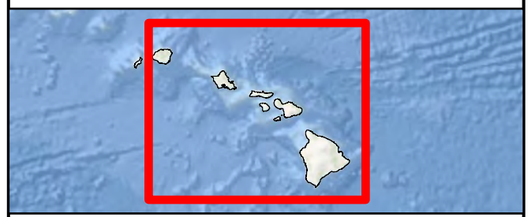
Figures

Hawaiian Islands Fiber Link

Figure 1
Project Overview



- Subsea Cable
- Cable Landing Site
- State Waters Limits (3 nautical miles)



0 20 40 80 120
Kilometers

0 10 20 40
Nautical Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\ProjectOverview_20240514\ONI_HIFL_ProjectOverview_20240801.aprx

Hawaiian Islands Fiber Link Project - Moloka'i Cable Landing Site

Figure 2
Project Study Area and Vicinity



- Study Area
- TMK Parcel
- Highway
- Roadway

Third-Party Infrastructure

- Fiber on Existing Overhead Utility System

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2 0.3
Miles

0 500 1,000
Feet

N W E S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 05/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Molokai_20250506\ONI_HIFL_BioReport_Molokai_20250506.aprx

-157°1'30"
-157°1'
-157°0'30"
21°5'30"
21°5'
100
200
Kamehameha V Hwy

Hawaiian Islands Fiber Link Project - Moloka'i Cable Landing Site

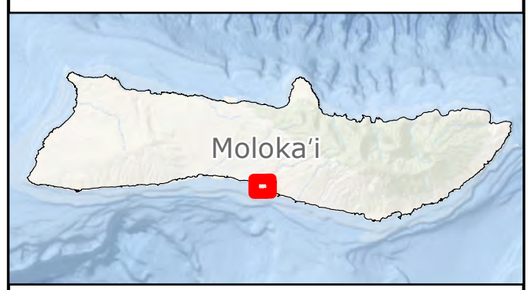
Figure 3
Topography and Soils

- Study Area
- 100-ft Elevation Contours
- Highway
- Roadway

NRCS Soil Unit

- KMW - Kealia silt loam, 0 to 1 percent slopes
- MmA - Mala silty clay, 0 to 3 percent slopes

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2
Miles

0 400 800 1,200
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 05/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

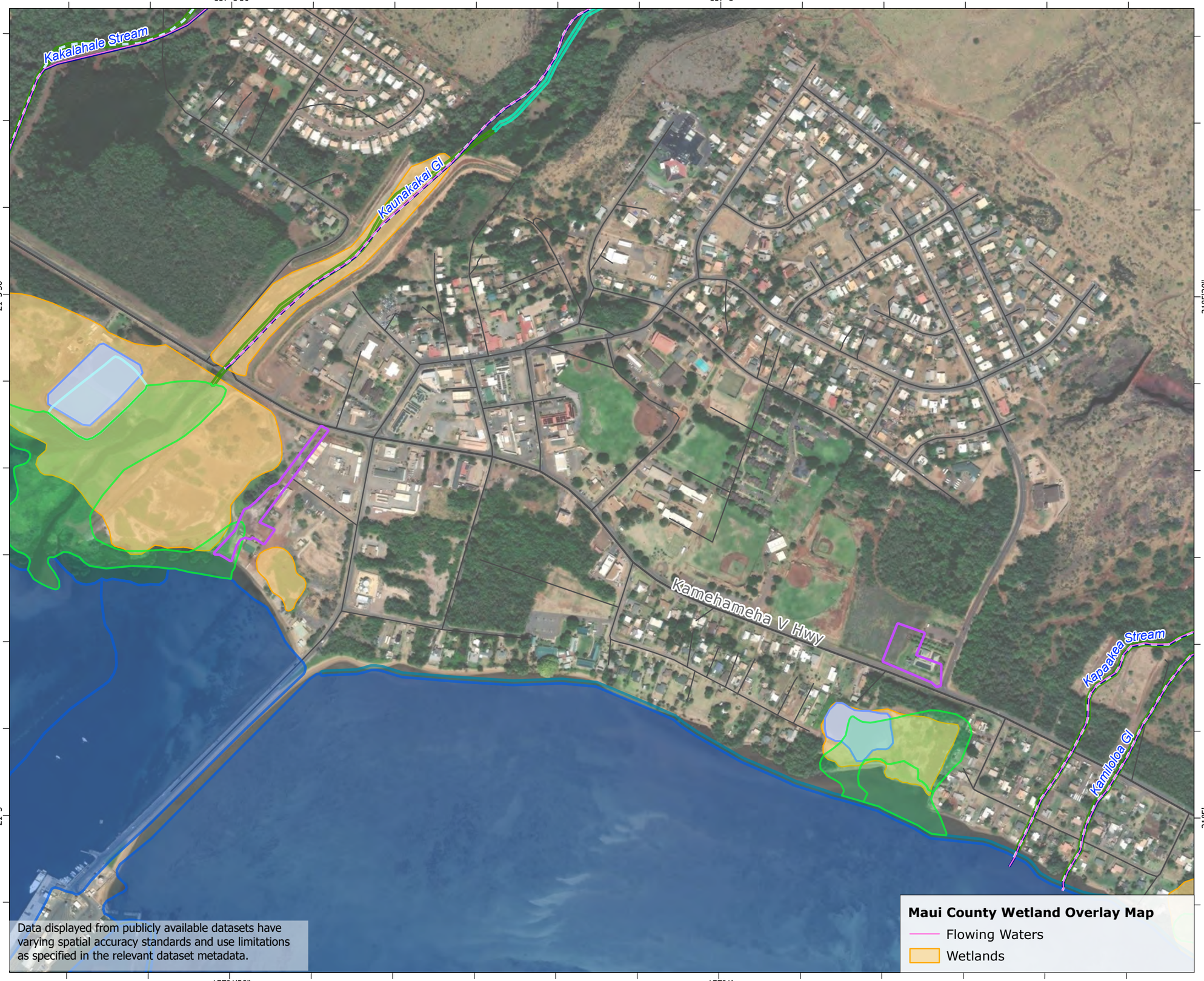
Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Molokai_20250506\MXD_HIFL_BioReport_Molokai_20250506.aprx

Hawaiian Islands Fiber Link Project - Moloka'i Cable Landing Site

Figure 4
Mapped Water Resources in the Study Area

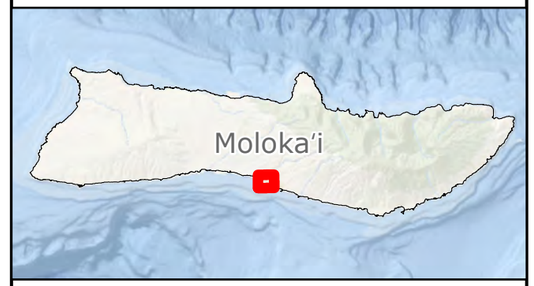


Study Area
Highway
Roadway

National Wetlands Inventory
Estuarine and Marine Deepwater
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Riverine

National Hydrography Dataset
Intermittent Stream
Waterbody

Division of Aquatic Resources
Stream



0 0.13 0.25
Miles

0 250 500 1,000
Feet

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

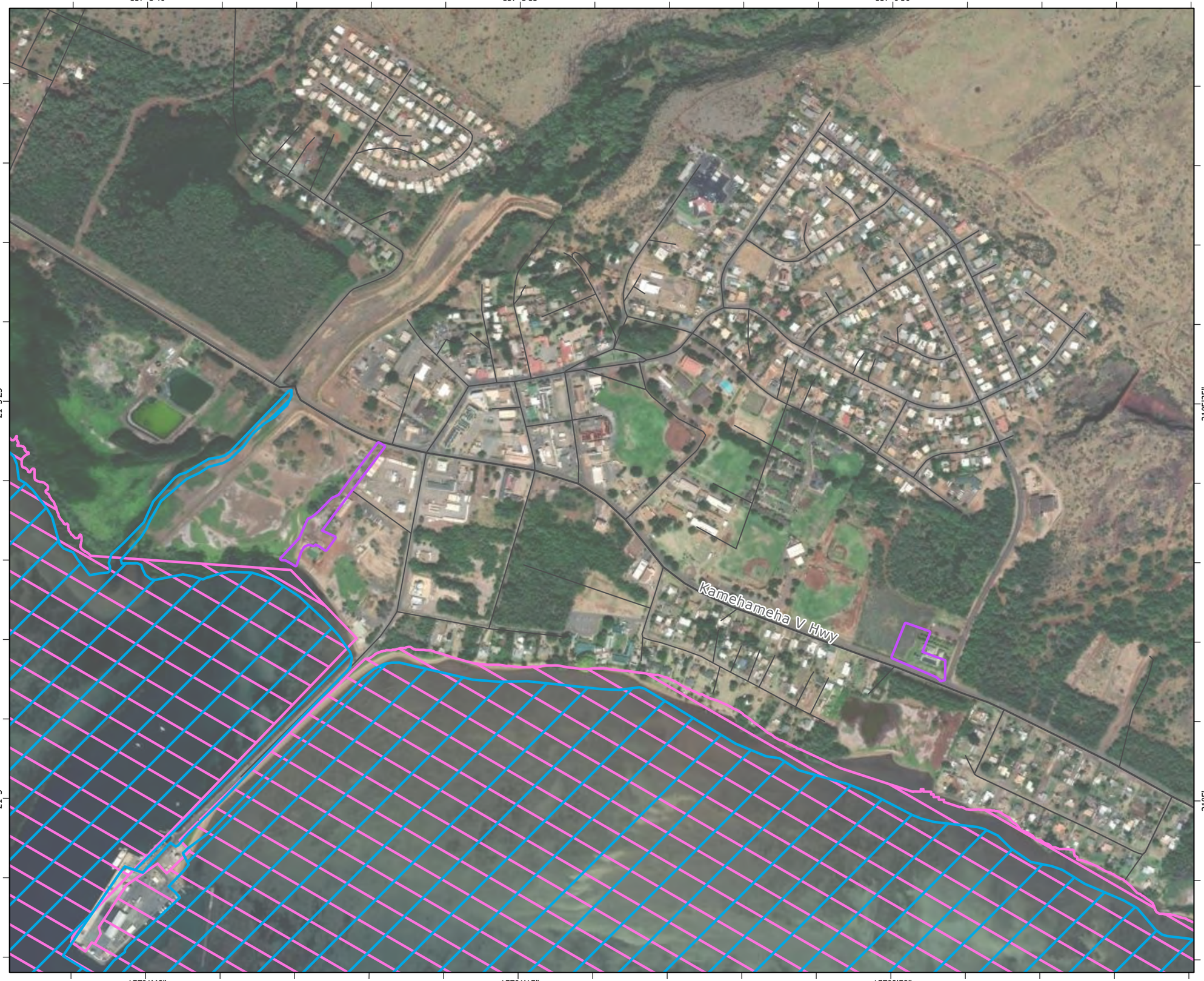
Date: 05/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Not for Construction

Document Path: \\cess706gisfs1\CESI\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Molokai_20250506\ONL_HIFL_BioReport_Molokai_20250506.aprx



Hawaiian Islands Fiber Link Project - Moloka'i Cable Landing Site

Figure 5
Critical Habitat Within the Vicinity

Study Area

Highway

Roadway

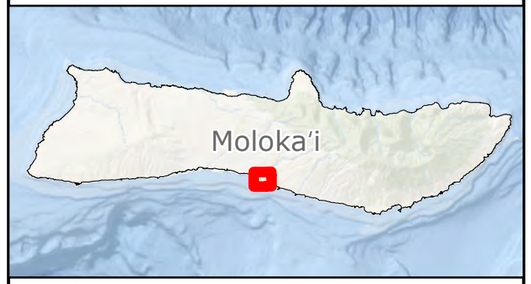
Proposed Green Sea Turtle *(Chelonia mydas)* Critical Habitat

Marine

Monk Seal *(Neomonachus schauinslandi)* Critical Habitat

Marine

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.1 0.2 0.3

Miles

0 500 1,000

Feet

N W E S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 05/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Molokai_20250506\ONI_HIFL_BioReport_Molokai_20250506.aprx



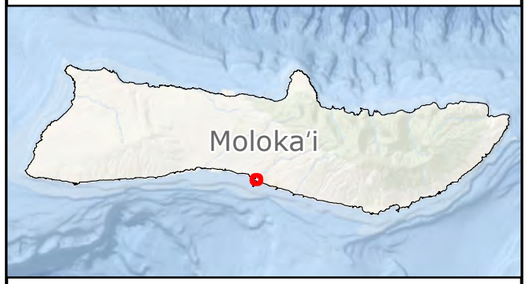
Hawaiian Islands Fiber Link Project - Moloka'i Cable Landing Site

Figure 6
Observations of Hawaiian Stilts

- Study Area
- Highway
- Roadway
- Hawaiian Stilt Observation*

*Point for Hawaiian stilts represents primary location where individuals were seen; however, birds transited across the Study Area.

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.01 0.03 0.04
Miles

0 100 200
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 05/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Molokai_20250506\ONL_HIFL_BioReport_Molokai_20250506.aprx

Appendix A

Representative Photographs of the Study Area



Photo 1. Looking makai (southwest) from the gate near Hio Place showing large areas devoid of vegetation at the Moloka'i Yacht Club (MYC) portion of Study Area. Lat/Long: 21.088659826, -157.024227316.



Photo 2. Developed areas and unvegetated, bare ground within the MYC portion of Study Area showing containers, Coast Guard Range Light, and concrete recreation area. Lat/Long: 21.087859, -157.024686.



Photo 3. Looking west from the eastern portion of the MYC portion of the Study Area showing bare ground, as well as pickleweed along the western boundary. Lat/Long: 21.08781, -157.024412.

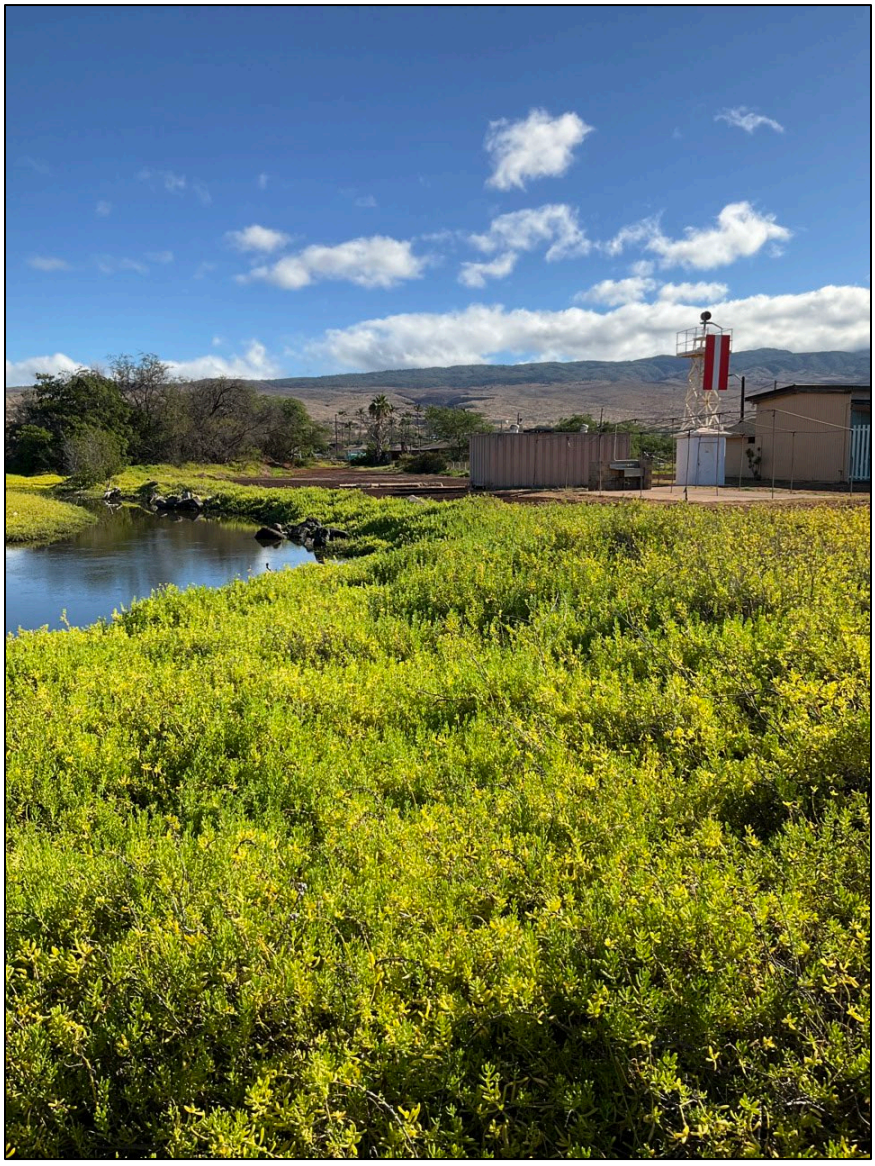


Photo 4. Looking northeast from the southwestern corner of the MYC portion of Study Area, showing Pickleweed Marsh and surface water along the western boundary. Lat/Long: 21.087554, -157.025232.



Photo 5. Looking east along the shoreline at the MYC portion of the Study Area showing pickleweed. Lat/Long: 21.0875342991, -157.025269012.



Photo 6. Looking north within the area between Hio Place and Kamehameha V Highway showing non-native Ruderal Vegetation and dumped materials in the MYC portion of the Study Area. Lat/Long: 21.088949837, -157.023867.



Photo 7. Looking at the lawn and planted kukui trees within the Landscaped Areas at the Moloka'i Education Center (MEC) portion of the Study Area. Lat/Long: 21.086354, -157.013199.



Photo 8. Looking at the lawn and planted native kou trees and naupaka kahakai shrubs at the MEC portion of the Study Area. Lat/Long: 21.085644, -157.013162.



Photo 9. Looking south at the cut vegetation in the western section of the MEC portion of Study Area. Lat/Long: 21.0860709, -157.013590.



Photo 10. Three listed Hawaiian stilt individuals seen on pickleweed in the wetland immediately west of the MYC portion of the Study Area. Lat/Long: 21.087687, -157.025038.



Photo 11. Endangered Hawaiian stilt vocalizing and flying toward the MYC portion of the Study Area from the wetland immediately to the west. Lat/Long: 21.087567, -157.025152.

Hawaiian Islands Fiber Link Project – Lānaʻi Cable Landing Site

Biological Resources Survey Report

Prepared for:
Ocean Networks, Inc. (ONI)

Revised August 2025

TETRA TECH

complex world | CLEAR SOLUTIONS™

Table of Contents

1.0 Introduction 1
1.1 Project Description 1
2.0 Description of the Study Area 2
2.1 Climate 2
2.2 Topography and Soils 3
2.3 Surface Waters 3
2.4 Critical Habitat for Listed Species 3
3.0 Methods 4
3.1 Plants 4
3.2 Wildlife 4
3.2.1 Birds 5
3.2.2 Terrestrial Mammals 5
3.2.3 Invertebrates 5
3.2.4 Sea Turtles and Marine Mammals 5
4.0 Results and Discussion 5
4.1 Plants 6
4.2 Wildlife 9
4.2.1 Birds 9
4.2.2 Terrestrial Mammals 10
4.2.3 Invertebrates 10
4.2.4 Sea Turtles and Marine Mammals 11
5.0 Conclusions and Recommendations 12
5.1 General 12
5.2 Plants 12
5.3 Wildlife 12
5.3.1 Listed Seabirds 13
5.3.2 Listed Waterbirds 13
5.3.3 Hawaiian Hoary Bat 13

5.3.4 Sea Turtles and Marine Mammals 13
6.0 References 14

List of Tables

Table 1. Monthly Rainfall at Lānaʻi Airport Gage Prior to and During the Survey 2
Table 2. Federally or State-listed Species with the Potential to Occur in the Study Area 7
Table 3. Native Plant Species Recorded in the Study Area During the Survey 8
Table 4. Bird Species Recorded in the Study Area and Immediate Vicinity 9
Table 5. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity 11

List of Figures

Figure 1. Project Overview
Figure 2. Project Study Area and Vicinity
Figure 3. Soils within the Study Area
Figure 4. Water Resources Mapped by NWI, NHD, and DAR
Figure 5. Critical Habitat Within the Study Area and Vicinity

List of Appendices

Appendix A. Representative Photographs of the Study Area

1.0 Introduction

The Hawaiian Islands Fiber Link (HIFL) Project is a proposed interisland submarine fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the State of Hawaiʻi. The Project would interconnect the six main Hawaiian Islands, with cable landing sites on Kauaʻi, Oʻahu, Maui, Lānaʻi, Molokai, and Hawaiʻi Island.

Tetra Tech was contracted to conduct a general biological survey within the 3.3-acre (1.3 hectare [ha]) terrestrial study area for the Lānaʻi cable landing site. The purpose of the survey was to characterize the species and habitats present, and to determine whether state or federally-listed threatened or endangered species (pursuant to the federal Endangered Species Act or Hawaiʻi Revised Statutes [HRS] Chapter 195D), or otherwise rare plants or animals have the potential to occur and could be impacted by construction or operation of the Project. This report summarizes the results of the biological surveys conducted within the Study Area by Tetra Tech on July 11, 2024.

1.1 Project Description

The HIFL Project involves construction, operation, and maintenance of an interisland fiber optic cable system that would interconnect the six main Hawaiian Islands to provide more robust, diverse, and reliable broadband connectivity throughout the state. The fiber optic cable system would distribute high-speed broadband to each island, with cable landing sites strategically located on Kauaʻi (Nukoliʻi Beach), Oʻahu (Barbers Point), Maui (Kahului), Lānaʻi (Mānele Harbor), Molokai (Molokai Yacht Club), and Hawaiʻi Island (Hilo). The overall extent of the Project is shown in Figure 1.

The system would include both marine and terrestrial components, with the marine component comprising approximately 416 miles (669 kilometers [km]) of fiber optic cable surface-laid on the seabed between the islands. The cable would have a maximum diameter of approximately 1.1 inch (28 millimeters [mm]), and would be installed in five distinct segments spanning the nearshore state waters and surrounding U.S. federal waters.

At the Lānaʻi cable landing site, a single subsurface borehole would be installed using horizontal directional drilling (HDD) to allow the subsea fiber optic cable(s) to traverse from the nearshore waters under the shoreline to the terrestrial Study Area. The terrestrial components that would be constructed within the Study Area would include a beach manhole (BMH) and land-based cable (terrestrial cable). The BMH would be a below-ground reinforced concrete vault (or similar) which would serve as the connection chamber between the subsea cable and terrestrial cable. From the BMH, the terrestrial cable would be installed in underground conduit to an existing manhole near the entrance driveway to the Mānele Small Boat Harbor. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, generally following a route along existing roadways to the University

of Hawaiʻi (UH) Lānaʻi Education Center in Lānaʻi City.[1] Space within an existing building at the Lānaʻi Education Center would be used as the cable landing station (CLS).[2] The CLS would house cable operation and monitoring equipment and facilitate interconnection with the local telecommunications network.

2.0 Description of the Study Area

As shown in Figure 2, the Study Area is located at the Mānele Small Boat Harbor on the south shore of the island of Lānaʻi. It encompasses 3.2 acres (1.3 ha) within tax map keys (TMK) (2) 4-9-017:006 (por.) and (2) 4-9-017:027 (por.), both owned by State of Hawaiʻi. The Study Area overlaps with facilities and user areas associated with the State of Hawaiʻi Mānele Small Boat Harbor and a portion of Mānele Road. It is bordered on the north and northeast by the harbor master's office and harbor and ferry facilities, including a breakwater structure, on the east by Mānele Bay, on the southwest by a fenced boat parking area, and on the south, and northwest by undeveloped land. The nearshore waters fall within the Mānele-Hulopoʻe Marine Life Conservation District and the Hawaiian Islands Humpback Whale National Marine Sanctuary. Hulopoʻe Beach Park is located 0.2 mile (0.3 km) to the southwest, the Four Seasons Resort Lānaʻi is located 0.4 mile (0.6 km) to the west, and Lānaʻi City is approximately 6 miles (9.7 km) to the northwest.

2.1 Climate

The climate in the Study Area is characterized as arid (Price et al. 2012). The closest functioning National Weather Service (NWS) rainfall gage to the Study Area is at the Lānaʻi Airport, located 5.2 miles (8.4 km) northwest of the Study Area. The monthly rainfall totals recorded at the gage prior to and during the surveys are shown in Table 1. The year-to-date total rainfall for this gage through the end of June 2024 was 70 percent of average (NWS 2024a), suggesting dry conditions during the July 2024 survey. Drought conditions for the area were characterized as abnormally dry in July 2024 (NWS 2024b).

Table 1. Monthly Rainfall at Lānaʻi Airport Gage Prior to and During the Survey

Date	Rainfall Total; Percentage of Average
May 2024	0.64 inches; 57%
June 2024	0.03 inches; 3%
July 2024	0.01 inches; 1%

Source: NWS 2024a.
Note: The month when the survey occurred is highlighted in light grey.

[1] The segment of terrestrial fiber on the existing utility system is described herein to provide an overview of the entire system but is not further addressed by this study because it comprises existing third-party infrastructure.

[2] Existing buildings were not included in the Study Area for biological surveys because the Project would not involve any new infrastructure or associated ground disturbance in the buildings.

2.2 Topography and Soils

The Study Area gently slopes from mauka to makai, with elevations ranging from approximately 20 feet (6 meters [m]) above mean sea level on the mauka end to sea level on the makai end. The topography changes sharply at the water's edge in the southeastern corner of the Study Area, where there is a rocky cliff at the shoreline.

The Natural Resources Conservation Service (NRCS) identifies three soil types in the Study Area: Sandy alluvial land; Very stony land; and Jaucus sand, 0 to 15 percent slopes (Figure 3; NRCS 2025). Sandy alluvial land is comprised of loamy and coarse sand and is characterized as excessively drained with high runoff and frequent flooding. Very stony land is comprised of ʻaʻā lava and volcanic ash and is characterized as well drained with high runoff and not liable to flooding. Jaucus sand is comprised of sand-sized coral, seashells, and sandy marine deposits derived from sedimentary rock and is characterized as excessively drained with low runoff and rare flooding events (NRCS 2025).

2.3 Surface Waters

The Study Area is situated within the Mānele watershed which encompasses roughly 3.7 square miles (9.6 square kilometers) (CWRM 2019, CWRM 2022). Surface water features identified in the vicinity of the Study Area by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data (USFWS 2024), the U.S. Geological Survey (USGS) topographic and National Hydrography Dataset (NHD; USGS 2023), and the State of Hawaiʻi Division of Aquatic Resources (DAR) dataset (DAR 2008) are shown in Figure 4. NWI identifies an intertidal estuarine and marine wetland along the shoreline (which overlaps with the eastern-most edge of the Study Area) and maps Mānele Bay and the ocean as estuarine and marine deepwater.

Several other surface water features are mapped in the vicinity of the Study Area including a freshwater pond roughly 100 feet (30 m) to the north and a riverine feature through the harbor parking lot roughly 360 feet (110 m) to the north (Figure 4). The datasets also identify Mānele Stream approximately 400 feet (122 m) to the north of the Study Area. Mānele Stream is classified as intermittent by NWI (USFWS 2024) and NHD (USGS 2023), and as perennial by DAR (DAR 2008).

2.4 Critical Habitat for Listed Species

Designated critical habitat for the endangered Hawaiian monk seal/ ʻīlio-holo-i-ka-uaua (*Neomonachus schauinslandi*) occurs adjacent to the eastern edge of the Study Area (Figure 5). This includes terrestrial habitat covering the area from the water's edge inland 16 feet (5 m) and marine habitat encompassing marine waters surrounding the island out to the 656-foot (200 m) depth contour line (NOAA 2015).

USFWS and the National Oceanic and Atmospheric Administration (NOAA) have proposed critical habitat for the Central North Pacific distinct population segment of the threatened green sea turtle/ honu (*Chelonia mydas*) within the Study Area. Proposed marine critical habitat includes all waters surrounding the island from the mean high water line to 65-foot (20 m) water depth (NOAA 2023a, NOAA 2023b),

which overlaps slightly with the Study Area (Figure 5). No proposed terrestrial critical habitat for the green sea turtle occurs within the Study Area or vicinity (NOAA 2023a, USFWS 2023a).

No critical habitat for threatened or endangered plants or terrestrial wildlife has been designated within the Study Area or vicinity (USFWS 2025).

3.0 Methods

Prior to the field surveys, Tetra Tech conducted a review of relevant publicly available literature and data with respect to biological resources in and near the Study Area. This review included environmental assessments and environmental impact statements, NWI and NHD data, scientific journals and reports, the USFWS Information for Planning and Consultation (IPaC) tool, and available, unpublished data that are relevant to the natural history and ecology of the area. In addition, Tetra Tech reviewed available geospatial data, aerial photographs, and topographic maps of the area to identify occurrences of state or federally-listed species, or habitats that could harbor these species. The biological field survey was conducted by Tetra Tech on July 11, 2024. Details regarding the field survey methodologies are provided below.

3.1 Plants

A pedestrian survey was conducted to identify and record common plant species and dominant vegetation types, as well as rare or listed plant species within the Study Area. Areas more likely to support native plants (e.g., rocky outcrops and shady areas) were more intensively examined. Plant identifications were made in the field; plants that could not be positively identified were photo-documented for comparison with the recent taxonomic literature.

Plants recorded during the survey are indicative of the season and environmental conditions at the time of the survey. The presence and location of plants can be influenced by seasonal and temporal changes; therefore, it is possible additional species may occur within the Study Area but were not present during the survey.

The taxonomy and nomenclature of plants are in accordance with Wagner et al. (2023). Common/ Hawaiian names are provided first, followed by scientific names in parentheses. If no common or Hawaiian name is known, only the scientific name is provided.

3.2 Wildlife

The wildlife survey consisted of observations and identification of birds, terrestrial and marine mammals, and conspicuous invertebrate species encountered while searching the Study Area. Tetra Tech recorded all wildlife seen or heard while walking and driving within the Study Area coupled with visual observation of scat, tracks, and other animal sign. Habitats or plants that could support listed wildlife species were also identified if present (such as host plants for listed invertebrates or water features as potential habitat for listed Hawaiian waterbirds). Specific survey methods of each wildlife group are provided below.

3.2.1 Birds

All birds seen or heard while walking within the Study Area and vicinity were recorded. Habitats or plants that could support listed birds were also identified if present (e.g., water features as potential habitat for listed Hawaiian waterbirds). Scientific nomenclature for birds follows *Birds of the World* (Billerman et al. 2022).

3.2.2 Terrestrial Mammals

The terrestrial mammal survey was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign while walking within the Study Area. Scientific names for mammals follow Tomich (1986).

Ultrasonic bat detectors for the endangered Hawaiian hoary bat/ ʻōpeʻapeʻa (*Lasiurus semotus*) were not deployed as part of the survey. Rather, as USFWS and State of Hawaiʻi Division of Forestry and Wildlife (DOFAW) recognize all woody vegetation greater than 15 feet (4.6 m) tall as potential bat roosting habitat (DOFAW 2015, USFWS 2023b), the presence/absence of suitable bat foraging and roosting habitat within the Study Area was noted.

3.2.3 Invertebrates

Observations of large and conspicuous insects and invertebrates were recorded incidentally to the wildlife survey while walking through the Study Area. Invertebrates were identified through visual observations and were not collected as specimens in the field. Scientific nomenclature for terrestrial invertebrates follows Nishida (2002), and WoRMS Editorial Board (2024) for marine invertebrates.

3.2.4 Sea Turtles and Marine Mammals

This survey focused on characterizing the nearshore marine and shoreline habitat for listed sea turtles and protected marine mammals (e.g., monk seals) and was limited to visual observations from the shoreline using binoculars. Biologists scanned the near-shore marine waters and suitable nearshore terrestrial habitat for individuals or their potential habitat.

4.0 Results and Discussion

The biological resources in the Study Area have been highly modified by historic land uses and the introduction of invasive species, which has greatly reduced the number and abundance of native species and habitats suitable for native species. Most of the Study Area has been developed for the boat harbor and includes infrastructure such as paved roads and pathways, vehicle and boat parking areas, two buildings and accessory structures associated with the harbor master's office, and a portion of the harbor breakwater. Representative photographs from the survey are presented in Appendix A.

No federally or state-listed species were observed within the Study Area during the survey. Although not observed in the Study Area, several listed animal species (including listed seabirds, listed waterbirds,

Hawaiian hoary bats, and Hawaiian monk seals) may occasionally occur in or traverse the Study Area. Listed species with the potential to occur in the Study Area are summarized in Table 2 and discussed in further detail below.

4.1 Plants

No federal or state listed threatened, endangered, proposed listed, or candidate plant species were observed in the Study Area during the survey. The Study Area is dominated by non-native plants. Six native plant species were observed in the Study Area (Table 3). These plants are indigenous to and common throughout the Hawaiian Islands (Wagner et al. 2023). The six native plant species observed during the survey are uncommon to moderately common throughout the Study Area.

Vegetation in the Study Area is characterized by two vegetation types: Landscaped Areas and Kiawe (*Neltuma pallida*)/ Buffelgrass (*Cenchrus ciliaris*) Forest. These are described in more detail below.

Table 2. Federally or State-listed Species with the Potential to Occur in the Study Area

Common/Hawaiian Name(s)	Scientific Name	Listing Status[1]	Critical Habitat in Study Area	Potential Occurrence in Study Area
Birds				
Hawaiian coot/ ʻalae keʻo keʻo	*Fulica alai*	SE, FE	None Designated	Preferred habitat not present, but could fly over or near the Study Area.
Hawaiian stilt/ aeʻo	*Himantopus mexicanus knudseni*	SE, FE	None Designated	Preferred habitat not present, but could fly over or near the Study Area.
Hawaiian petrel/ ʻuaʻu	*Pterodroma sandwichensis*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Newell's shearwater/ ʻaʻo	*Puffinus auricularis newelli*	ST, FT	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (March and December).
Band-rumped storm-petrel/ ʻakēʻakē	*Hydrobates castro*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (March and December).
Terrestrial Mammals				
Hawaiian hoary bat/ ʻōpeʻapeʻa	*Lasiurus semotus*	SE, FE	None Designated	Could traverse or forage in the Study Area or roost in vegetation > 15 feet in height.
Sea Turtles and Marine Mammals				
Green sea turtle/ honu	*Chelonia mydas*	ST, FT	Proposed marine within eastern corner	Not known to nest in or near the Study Area, but could forage offshore.
Hawaiian monk seal/ ʻīlio-holo-i-kauaua	*Neomonachus schauinslandi*	SE, FE	Designated marine and terrestrial immediately east	Unlikely to haul out in Study Area, but could haul out in the vicinity or forage offshore.

1. FE = Federally endangered; SE = State endangered; FT = Federally threatened; ST = State threatened.

Table 3. Native Plant Species Recorded in the Study Area During the Survey

Common/Hawaiian Name	Scientific Name	Status
hoary abutilon	*Abutilon incanum*	I
kou	*Cordia subcordata*	I
milo	*Thespesia populnea*	I
pōhinahina	*Vitex rotundifolia*	I
pōhuehue	*Ipomoea pes-caprae* subsp. *brasiliensis*	I
ʻuhaloa	*Waltheria indica*	I
Status: I = Indigenous (native to the Hawaiian Islands and elsewhere).		

Landscaped Areas: This vegetation type occurs in the northern and central portions of the Study Area along the edges of Mānele Road and around the harbor master's office and associated parking areas. Landscaping consists of maintained lawns of primarily wide-leaved carpetgrass (*Axonopus compressus*), Bermuda grass (*Cynodon dactylon*), and Hilo grass (*Paspalum conjugatum*) and plantings of non-native ornamental plants bordering the lawns into which weedy species have intruded (Appendix A, Photos 1 – 3). Trees within this vegetation type reach heights up to 30 feet (9 m). Planted species within this vegetation type include date palm (*Phoenix* sp.), candle bush (*Senna alata*), Swiss-cheese plant (*Monstera deliciosa*), spider lily (*Crinum asiaticum*), croton (*Codiaeum variegatum*), plumeria (*Plumeria* sp.), monkeypod (*Samanea saman*), Manila palm (*Veitchia merrillii*), banyan (*Ficus* sp.), coconut palm (*Cocos nucifera*), kalo (*Colocasia esculenta*), tī (*Cordyline fruticosa*), papaya (*Carica papaya*), and aloe vera (*Aloe vera*). A stand of banana (*Musa* sp.) trees is also planted on the edge of the paved car parking lot and fenced boat parking area west of the harbor master's office. Weedy species growing among and along the disturbed edges of the landscaped areas include swollen fingergrass (*Chloris barbata*), Carolina love grass (*Eragrostis pectinacea*), scarlet boerhavia (*Boerhavia coccinea*), *Cyperus mindorensis*, hairy spurge (*Euphorbia hirta*), Oriental hawksbeard (*Youngia japonica*), bitter melon (*Momordica charantia*), mallow plant (*Sida cordifolia*), obscure morning glory (*Ipomoea obscura*), pilipili (*Drymaria cordata* var. *pacifica*), and goosefoot (*Dysphania carinata*). Native species planted within this vegetation type are few but include kou (*Cordia subcordata*), milo (*Thespesia populnea*), pōhinahina (*Vitex rotundifolia*), and pōhuehue (*Ipomoea pes-caprae* subsp. *brasiliensis*). Scattered individuals of the native ʻuhaloa (*Waltheria indica*) and hoary abutilon (*Abutilon incanum*) grow naturally along the disturbed edges of this vegetation type.

Kiawe/ Buffelgrass Forest: This vegetation type occurs as a relatively narrow band along the southern margin of the Study Area. It is dominated by moderately open to dense stands of kiawe trees up to 23 feet (7 m) in height with an understory of sparse to moderately dense patches of buffelgrass (*Cenchrus ciliaris*) (Appendix A, Photos 4 – 5). Non-native weedy plants scattered in the understory include golden crown-beard (*Verbesina encelioides*), spiny amaranth (*Amaranthus spinosus*), Carolina love grass, swollen fingergrass, mallow plant, obscure morning glory, bitter melon, and scarlet boerhavia. Native

species present in this vegetation type include ʻuhaloa, which is rare in occurrence, as well as hoary abutilon, which is moderately common, particularly along the southeastern boundary of the Study Area.

4.2 Wildlife

4.2.1 Birds

Ten bird species were recorded in the Study Area and immediate vicinity during the survey (Table 4). All of these bird species are non-native to the Hawaiian Islands with the exception of the great frigatebird/ ʻiwa (*Fregata minor*), and are species commonly found on Lānaʻi. The most common bird species recorded during the survey were Gambel's quail (*Callipepla gambelii*), common myna (*Acridotheres tristis*), and gray francolin (*Ortygornis pondicerianus*). Only one bird species observed, the northern cardinal (*Cardinalis cardinalis*), is protected by the Migratory Bird Treaty Act (Table 4). Although not observed during the survey, it is possible that other MBTA-protected species such as wedge-tailed shearwater/ ʻuau kani (*Ardenna pacifica*), wandering tattler/ ʻūlili (*Tringa incana*), and Pacific golden-plover/ kōlea (*Pluvialis fulva*) could also occasionally occur in or transit the Study Area (eBird 2021). Information about state and federally listed birds that were not recorded during the survey, but have the potential to occasionally be present in or traverse the Study Area, is provided below.

Table 4. Bird Species Recorded in the Study Area and Immediate Vicinity

Common/Hawaiian Name	Scientific Name	Status
Chukar	*Alectoris chukar*	NN
Common myna	*Acridotheres tristis*	NN
Gambel's quail	*Callipepla gambelii*	NN
Gray francolin	*Ortygornis pondicerianus*	NN
Great frigatebird/ ʻiwa	*Fregata minor*	I
House sparrow	*Passer domesticus*	NN
Northern cardinal	*Cardinalis cardinalis* [1]	NN
Red-crested cardinal	*Paroaria coronata*	NN
Warbling white-eye	*Zosterops japonicus*	NN
Zebra dove	*Geopelia striata*	NN
Status: I = Indigenous, NN = Non-native established species. 1. Protected by the Migratory Bird Treaty Act (MBTA).		

Listed Waterbirds: The endangered Hawaiian stilt/ aeʻo (*Himantopus mexicanus knudseni*) and Hawaiian coot/ ʻalae keʻokeʻo (*Fulica alai*), collectively referred to as listed waterbirds, were not observed during the survey and their preferred habitats (e.g., wetlands, streams, ponds, mudflats, reservoirs) are not present in the Study Area; however, these listed waterbirds are present on island and could fly over or near the Study Area while traveling between suitable habitat outside of the Study Area. These species

are also known to utilize various artificial wetlands and habitat in Lānaʻi City and elsewhere on island (Raine et al. 2024) and at nearby Hulopoʻe Beach Park (eBird 2021). Potential habitat for listed waterbirds may be present in the freshwater pond feature identified by NWI north of the Study Area (Figure 4).

Listed Seabirds: The endangered Hawaiian petrel/ ʻuaʻu (*Pterodroma sandwichensis*), threatened Newell's shearwater/ ʻaʻo (*Puffinus newelli*), and endangered band-rumped storm-petrel/ ʻakēʻakē (*Hydrobates castro*) (collectively referred to as listed seabirds) have not been documented in the Study Area, and suitable nesting habitat does not occur in the Study Area. However, these birds have the potential to fly over the Study Area at night between March and December while transiting between upper elevation nest sites and the ocean. These listed seabirds are known to be attracted to outdoor lighting at night; after circling the lights, they can become exhausted and collide with nearby structures or fall to the ground (USFWS 2023b).

4.2.2 Terrestrial Mammals

Two non-native terrestrial mammalian species were detected during the survey. Axis deer (*Axis axis*) tracks and scat were seen in the Study Area and a house mouse (*Mus musculus*) was also observed. Although not observed during the survey, other introduced mammals, such as rats (*Rattus* spp.), feral cats (*Felix catus*), small Indian mongoose (*Herpestes auropunctatus*), and dogs (*Canis familiaris*) are likely to occur within the Study Area. Predator control traps and cameras presumed to target non-native species were observed just south of the Study Area indicating non-native mammals may be present in the area.

Recent studies have found that Hawaiʻi's only native, extant terrestrial mammal—the endangered Hawaiian hoary bat—is more abundant across the Hawaiian Islands than previously understood (Gorresen et al. 2013, Bonaccorso et al. 2015, USGS 2019). This species will forage in open and semi-cluttered landscapes in a wide range of habitats and vegetation types, such as in open areas, at forest edges or within gaps, and over open water bodies including streams, ponds, and along shorelines (Jacobs 1994, Jacobs 1999, Bonaccorso et al. 2015, Pinzari et al. 2019). Hawaiian hoary bats are tree-roosting bats and roost in various native and non-native trees (USFWS 1998, Gorresen et al. 2013, Montoya-Aiona et al. 2023). Kiawe trees and other planted trees within the Study Area (e.g., monkeypod and banyan trees) are over 15 feet (4.6 m) tall and have the potential to function as bat roost trees (DOFAW 2015, USFWS 2023b). Thus, Hawaiian hoary bats may transit, roost, or forage in portions of the Study Area.

4.2.3 Invertebrates

Large and conspicuous invertebrates incidentally observed during the survey are listed in Table 5. Along the shoreline, two native marine invertebrate taxa were observed; endemic marine gastropods known in Hawaiʻi as ʻopihi (*Cellana* sp.) and the indigenous ʻaʻama crab (*Grapsus tenuicrustatus*). One native dragonfly species, the globe skimmer (*Pantala flavescens*), was also recorded.

Table 5. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity

Common/Hawaiian Name	Scientific Name	Status
ʻA'ama crab	*Grapsus tenuicrustatus*	I
Crab spider	Mecaphesa *	NN
Geometrid caterpillar	Geometridae *	NN
Giant African snail	*Achatina fulica*	NN
Globe skimmer	*Pantala flavescens*	I
Hover fly	Syrphidae *	NN
Leaf cutter bee	Megachilidae *	NN
Monarch	*Danaus plexippus*	NN
ʻOpihi	*Cellana* sp.	E
Parasitoid Wasp	Ichneumonidae *	NN
Spotless lady beetle	*Cycloneda sanguinea*	NN
Wasp	Vespidae*	NN
Western honeybee	*Apis mellifera*	NN
Status: E = Endemic, I = Indigenous, NN = Non-native species. * = Represents order or family because lower taxonomic identification could not be made in the field.		

4.2.4 Sea Turtles and Marine Mammals

No sea turtles, monk seals, or other marine mammals were recorded in the Study Area during the survey. However, a monk seal was observed approximately 0.25 miles (0.4 km) northeast of the Study Area, hauled out on the only sandy section of beach in Mānele Bay. Hawaiian monk seals spend most of their time in the ocean, but also haul out on land for resting, pupping, nursing, molting, and avoiding predators). Monk seals primarily haul out on sandy beaches, but also utilize coral rubble, rocky and volcanic substrates (NMFS 2007, NOAA 2011). The coastal habitat in the Study Area and immediate vicinity (Appendix A, Photo 6) is generally unsuitable for use by the Hawaiian monk seal due to the hard, rocky shoreline and lack of beaches (Hoʻokuleana 2017).

In Hawaiʻi, green sea turtles mostly nest on sandy beaches close to where they were hatched (NOAA 2023b), and the species is not known to nest in the Study Area (USFWS 2023a). Green sea turtles often forage in shallow reefs throughout the main Hawaiian Islands where their food source is plentiful (Balazs et al. 1987). Although not observed from shore, green sea turtle food resources (e.g., macroalgae, seagrass) could be in the marine environment near the Study Area; therefore, it is possible green sea turtles could forage in the general area.

The endangered hawksbill sea turtle (*Eretmochelys imbricata*) is a rare species of sea turtle that uses similar feeding grounds to the green sea turtle (Gaos et al. 2020) and nests on a wide range of

substrates (USFWS 2023b). There is a lack of available information on the nesting and foraging locations for this species but based on the possible presence of food resources in the nearby marine environment this species has the potential to forage in the ocean offshore of the Study Area.

5.0 Conclusions and Recommendations

As described in Section 4, the majority of the plants and animals observed in the Study Area are non-native to the Hawaiian Islands. No federal and state listed species were observed within the Study Area during the biological survey. Although not observed, several listed wildlife species have the potential to occur in or transit through the Study Area, such as listed waterbirds, listed seabirds, and the Hawaiian hoary bat. Recommended measures to avoid and minimize impacts to these species are outlined below.

5.1 General

In addition to the species-specific measures detailed below, Tetra Tech recommends the following general measures to avoid and minimize impacts to biological resources:

- Although non-native weedy species are common in the Study Area, invasive species minimization measures should be implemented to avoid unintentional introduction or transport of new invasive species to the area. This includes utilizing on-site gravel, rock, and soil (or purchasing from a local supplier) when practicable; utilizing certified, weed-free seed mixes; and washing construction equipment and/or visually inspecting equipment for excessive debris, plant materials, and invasive or harmful non-native species as appropriate.
- Staff should be trained to identify listed wildlife or MBTA-protected birds that may be found onsite (e.g., listed seabirds) and to take appropriate steps if listed wildlife species are found
- If downed listed wildlife species are observed at the Project, notify USFWS and DOFAW as soon as possible.

5.2 Plants

No listed or rare plant species were observed during the survey. Overall, the vegetation in the Study Area is highly disturbed from previous land use activities, and non-native invasive plants dominate. Only six native plant species were observed, all of which commonly occur throughout Hawaiʻi. Tetra Tech recommends the following with regards to plants:

- If landscaping is installed as part of the Project, use non-invasive plants and incorporate native plant species to the maximum extent practicable.

5.3 Wildlife

Nearly all the animal species recorded in the Study Area are not native to the Hawaiian Islands. Only one native bird and three native invertebrates were recorded within the Study Area. Habitat present in the Study Area is generally not suitable for listed wildlife. However, several listed animal species have the potential to occasionally occur in or transit the Study Area.

5.3.1 Listed Seabirds

The Study Area does not provide suitable nesting or foraging habitat for the three listed seabirds. However, individuals may fly over the area during the breeding, nesting, and fledging seasons (March 1 - December 15) and may be attracted to nighttime lighting. Disorientation and fallout as a result of light attraction could occur for individuals attracted to unshielded nighttime lighting. Juvenile birds are particularly vulnerable to light attraction, and grounded birds are vulnerable to mammalian predators or vehicle strikes (Rodríguez et al. 2017). Tetra Tech recommends the following measures to avoid and minimize potential impacts to listed seabirds:

- If operational on-site lighting is required, it should consist of fixtures that will be shielded and/or directed downward to prevent upward radiation, triggered by a motion detector, and fitted with non-white light bulbs to the extent possible.
- Avoid the use of nighttime lighting that could attract seabirds during the seabird peak fallout period (September 15 - December 15).
- If a grounded seabird is found at the Project, contact USFWS and DOFAW immediately. These agencies may recommend contacting Maui Nui Seabird Recovery Project at (808) 280-4114.
- Minimize construction of overhead lines to reduce potential collision risk for seabird species.

5.3.2 Listed Waterbirds

No listed waterbirds were detected during the survey, and no suitable habitat for listed waterbirds was observed within the Study Area; however, suitable habitat is present in the vicinity. To avoid impacts to listed waterbirds during Project construction and operation, Tetra Tech recommends the following based on avoidance and minimization measures provided by USFWS (2023b):

- Avoid creating areas with standing water.
- If listed waterbirds are found in the Study Area during active construction, cease all activities within 100 feet (30 m) of the bird(s), and do not approach the bird(s). Work may continue after the listed waterbird leaves the area of its own accord.

5.3.3 Hawaiian Hoary Bat

Direct impacts to bats could occur if roost trees are disturbed or through the use of barbed wire. Tetra Tech recommends the following avoidance measures provided by USFWS (2023b):

- To prevent entanglement, do not use barbed wire for fencing.
- Do not trim, disturb, or remove woody vegetation taller than 15 feet (4.6 m) between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

5.3.4 Sea Turtles and Marine Mammals

No sea turtles or marine mammals were detected within the Study Area during the survey, but suitable habitat for monk seals is present in the vicinity of the Study Area, and green and hawksbill sea turtles

have the potential to forage in the nearshore waters. Tetra Tech recommends following the Standard Local Operating Procedures for Endangered Species in the Central and Western Pacific Region (Pac-SLOPES) provided by U.S. Army Corps of Engineers (USACE 2022) to minimize impacts to ESA-listed marine species (sea turtles, marine mammals, sharks, rays) and their habitats. Tetra Tech also recommends the following avoidance measures adapted from USFWS (2023b):

- Have a biologist (or qualified, trained individual) familiar with sea turtles and monk seals conduct a visual survey of the project site immediately prior to work to ensure no sea turtles or monk seals are present. If these species are found within the project area, cease all mechanical or construction activities within 100 feet (30 m) until the animal voluntarily leaves the area.
- Remove any project-related debris, trash, or equipment from the beach/shoreline if not actively being used.
- Do not stockpile project-related materials in the intertidal zone, reef flats, sandy beach, and adjacent vegetated areas.
- Incorporate applicable USFWS best management practices regarding Work in Aquatic Environments (USFWS 2022).
- Avoid nighttime work during the nesting (May-September) and hatching season (November-December) of sea turtles.
- Minimize the use of lighting on or near beaches and shield all project-related lights so the light is not visible from the beach/shoreline.
- Incorporate design measures into the construction or operation of buildings adjacent to the beach/shoreline to reduce ambient outdoor lighting.

6.0 References

Balazs, G.H., R.G. Forsyth, and A.K.H. Kam. 1987. Preliminary Assessment of Habitat Utilization by Hawaiian Green Turtles in their Resident Foraging Pastures. National Oceanic and Atmospheric Administration. NOAA Technical Memorandum Series NOAA-TM-NMFS-SWFC; 71. Accessed July 2024. https://repository.library.noaa.gov/view/noaa/5758.

Billerman, S.M., B.K. Keeney, P.G. Rodewald, and T.S. Schulenberg (Editors). 2022. Birds of the World. Cornell Laboratory of Ornithology, Ithaca, NY, USA. Accessed July 2024. https://birdsoftheworld.org/bow/home.

Bonaccorso, F.J., C.M. Todd, A.C. Miles, and P.M. Gorresen. 2015. Foraging Range Movements of the Endangered Hawaiian Hoary Bat, *Lasiurus cinereus semotus*. Journal of Mammalogy 96(1):64-71.

CWRM (State of Hawaii, Department of Land and Natural Resources: Commission on Water Resource Management). 2019. Water Resource Protection Plan. Prepared by Townscape, Inc. Accessed July 2024. https://files.hawaii.gov/dlnr/cwrm/planning/wrpp2019update/WRPP_ALL_201907.pdf.

CWRM. 2022. Surface water hydrologic unit boundaries for the 8 major Hawaiian Islands as of August 2022. Layer Name: Watersheds (CWRM). Accessed July 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::watersheds/explore?location=19.907608%2C-155.475058%2C8.18.

DAR (State of Hawaiʻi Division of Aquatic Resources). 2008. Streams (both perennial and non-perennial). Accessed July 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::streams/about.

DOFAW (State of Hawaiʻi, Department of Land and Natural Resources: Division of Forestry and Wildlife). 2015. Endangered Species Recovery Committee Hawaiian Hoary Bat Guidance Document.

eBird. 2021. eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York. Accessed September 2024. http://www.ebird.org.

Gaos, A.R., E.L. LaCasella, L. Kurpita, G. Balazs, S. Hargrove, C. King, H. Bernard, T.T. Jones, and P.H. Dutton. 2020. Hawaiian Hawksbills: A Distinct and Isolated Nesting Colony in the Central North Pacific Ocean Revealed by Mitochondrial DNA. Conservation Genetics, 21: 771–783. https://doi.org/10.1007/s10592-020-01287-1.

Gorresen, P.M., F.J. Bonaccorso, C.A. Pinzari, C.M. Todd, K. Montoya-Aiona, and K. Brinck. 2013. A five-year study of Hawaiian hoary bat (*Lasiurus cinereus semotus*) occupancy on the island of Hawaiʻi. Technical Report HCSU-041. Hawaiʻi Cooperative Studies Unit, University of Hawaiʻi at Hilo, Hilo, HI. July 2013.

Hoʻokuleana (Hoʻokuleana LLC). 2017. Final Environmental Assessment for Exclusive Permanent Moorings of Mānele Harbor and Exclusive Day Use Dive Site Moorings Lānaʻi South Shore. Prepared by Hoʻokuleana LLC for State Department of Land and Natural Resources and Applicant Pūlama Lānaʻi.

Jacobs, D.S. 1994. Distribution and abundance of the endangered Hawaiian hoary bat, *Lasiurus cinereus semotus*, on the island of Hawai'i. Pacific Science. 48(2): 193-200.

Jacobs, D.S. 1999. The diet of the insectivorous Hawaiian hoary bat (*Lasiurus cinereus semotus*) in an open and a cluttered habitat. Canadian Journal of Zoology. 77: 1603-1608. 10.1139/z99-110.Magnacca, K.N., and C. King. 2013. Assessing the presence and distribution of 23 Hawaiian yellow-faced bee species on lands adjacent to military installations on Oʻahu and Hawaiʻi Island. Pacific Cooperative Studies Unit, University of Hawaiʻi at Mānoa. Technical Report 185.

Montoya-Aiona, K., P.M. Gorresen, K.N. Courtot, A. Aguirre, F. Calderon, S. Casler, S. Ciarrachi, J. Hoeh, J.L. Tupu, and T. Zinn. 2023. Multi-scale assessment of roost selection by ʻōpeʻapeʻa, the Hawaiian hoary bat (*Lasiurus semotus*). Plos one, 18(8): e0288280.

NMFS (National Marine Fisheries Service). 2007. Recovery plan for the Hawaiian monk seal (*Monachus schauinslandi*), Revision. https://repository.library.noaa.gov/view/noaa/3521.

NOAA (National Oceanic and Atmospheric Administration). 2011. Endangered and Threatened Wildlife and Plants: Proposed Rulemaking to Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 76 (106): 32026 –32063.

NOAA. 2015. Endangered and Threatened Wildlife and Plants: Final Rulemaking To Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 80 (162): 50926–50988.

NOAA. 2020. Humpback Whale National Marine Sanctuary Boundaries for the State of Hawaiʻi. NOAA National Marine Sanctuary Program. Accessed July 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::national-marine-whale-sanctuary/about.

NOAA. 2023a. National ESA Critical Habitat Mapper (v1.0) by the National Marine Fisheries Service. Accessed March 2025. https://www.fisheries.noaa.gov/resource/map/national-esa-critical-habitat-mapper.

NOAA. 2023b. Endangered and Threatened Wildlife and Plants: Proposed Rule To Designate Marine Critical Habitat for Six Distinct Population Segments of Green Sea Turtles. Federal Register. 88(137): 46572–46671.

NRCS (Natural Resources Conservation Service). 2025. Web Soil Survey. Accessed March 2025. http://websoilsurvey.nrcs.usda.gov/.

NWS (National Weather Service). 2024a. Precipitation Summaries. Accessed July 2024. https://www.weather.gov/hfo/hydro_summary.

NWS. 2024b. Drought Information Statement For the Main Hawaiian Islands Valid July 12, 2024. Accessed August 2024. https://www.weather.gov/hfo/DroughtInformationStatement.

Nishida, G. 2002. Hawaiian Terrestrial Arthropod Checklist. 4th Edition. Hawaiʻi Biological Survey Bishop Museum.

Pinzari, C., R. Peck, T. Zinn, D. Gross, K. Montoya-Aiona, K. Brinck, M. Gorressen, and F. Bonaccorso. 2019. Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) activity, diet and prey availability at the Waihou Mitigation Area, Maui. Technical Report HCSU-090. Hawaiʻi Cooperative Studies Unit, University of Hawaiʻi at Hilo, Hilo, Hawaiʻi. June 2019.

Price, J. P., J. Jacobi, D., S.M. Gon (III), D. Matsuwaki, L. Mehrhoff, W. Wagner, M. Lucas, and B. Rowe. 2012. Mapping plant species ranges in the Hawaiʻian Islands—Developing a methodology and associated GIS layers. U.S. Geological Survey Open-File Report 2012–1192, 34 p., one appendix (species table), 1,158 maps. http://pubs.usgs.gov/of/2012/1192/.

Raine, H., J. Idle, K. Harmon, and M. Iglecia. 2024. Strategic Plan for Hawaiʻi Wetlands 2024. Pacific Birds Joint Venture.

Rodríguez, A., N.D. Holmes, P.G. Ryan, K.-J. Wilson, L. Faulquier, Y. Murillo, A.F. Raine, J.F. Penniman, V. Neves, B. Rodríguez, J.J Negro, A. Chiaradia, P. Dann, T. Anderson, B. Metzger, M. Shirai, L. Deppe, J. Wheeler, P. Hodum, C. Gouveia, V. Carmo, G.P. Carreira, L. Delgado-Alburqueque, C.

Guerra-Correa, F.-X. Couzi, M. Travers and M.L. Corre. 2017. Seabird mortality induced by land-based artificial lights. Conservation Biology, 31: 986-1001.

Tomich, P.Q. 1986. Mammals in Hawaii. Bishop Museum Press, Honolulu, HI. 375 pp.

USACE (U.S. Army Corps of Engineers). 2022. Pac-Slopes BMPS. Revised: 02 March 2022. Provided to Tetra Tech by USACE on March 6, 2023.

USFWS (U.S. Fish and Wildlife Service). 1998. Recovery Plan for the Hawaiian hoary bat (*Lasiurus cinereus semotus*). U.S. Fish and Wildlife Service, Portland, OR.

USFWS. 2022. Best Management Practices for Work in or Around Aquatic Environments. Accessed July 2024. https://www.fws.gov/sites/default/files/documents/Best%20Management%20Practices%20For%20Work%20In%20or%20Around%20Aquatic%20Environment-April%202022.pdf.

USFWS. 2023a. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Green Sea Turtle. Federal Register. 88 (137): 46376- 46570.

USFWS. 2023b. Animal Avoidance and Minimization Measures. Accessed March 2025. https://www.fws.gov/sites/default/files/documents/Animal Avoidance and Minimization Measures - FINAL May 2023_0.pdf.

USFWS. 2024. National Wetlands Inventory. Wetlands Data by State, Hawaiʻi. Accessed March 2025. https://www.fws.gov/node/264847.

USFWS. 2025. Critical Habitat - Polygon Features – Final. Accessed March 2025. https://www.arcgis.com/apps/mapviewer/index.html?url=https://services.arcgis.com/QVENGdaPbd4LUkLV/ArcGIS/rest/services/USFWS_Critical_Habitat/FeatureServer&source=sd.

USGS (U.S. Geologic Survey). 2019. Ecology and Distribution of the Endangered Hawaiian Hoary Bat. Accessed July 2024. https://www.usgs.gov/pacific-island-ecosystems-research-center/science/ecology-and-distribution-endangered-hawaiian#:~:text=Distribution%20and%20seasonal%20altitudinal%20migration,appears%20to%20occur%20was%20documented.

USGS. 2023. National Hydrography Dataset. Accessed March 2025. https://www.usgs.gov/national-hydrography/access-national-hydrography-products.

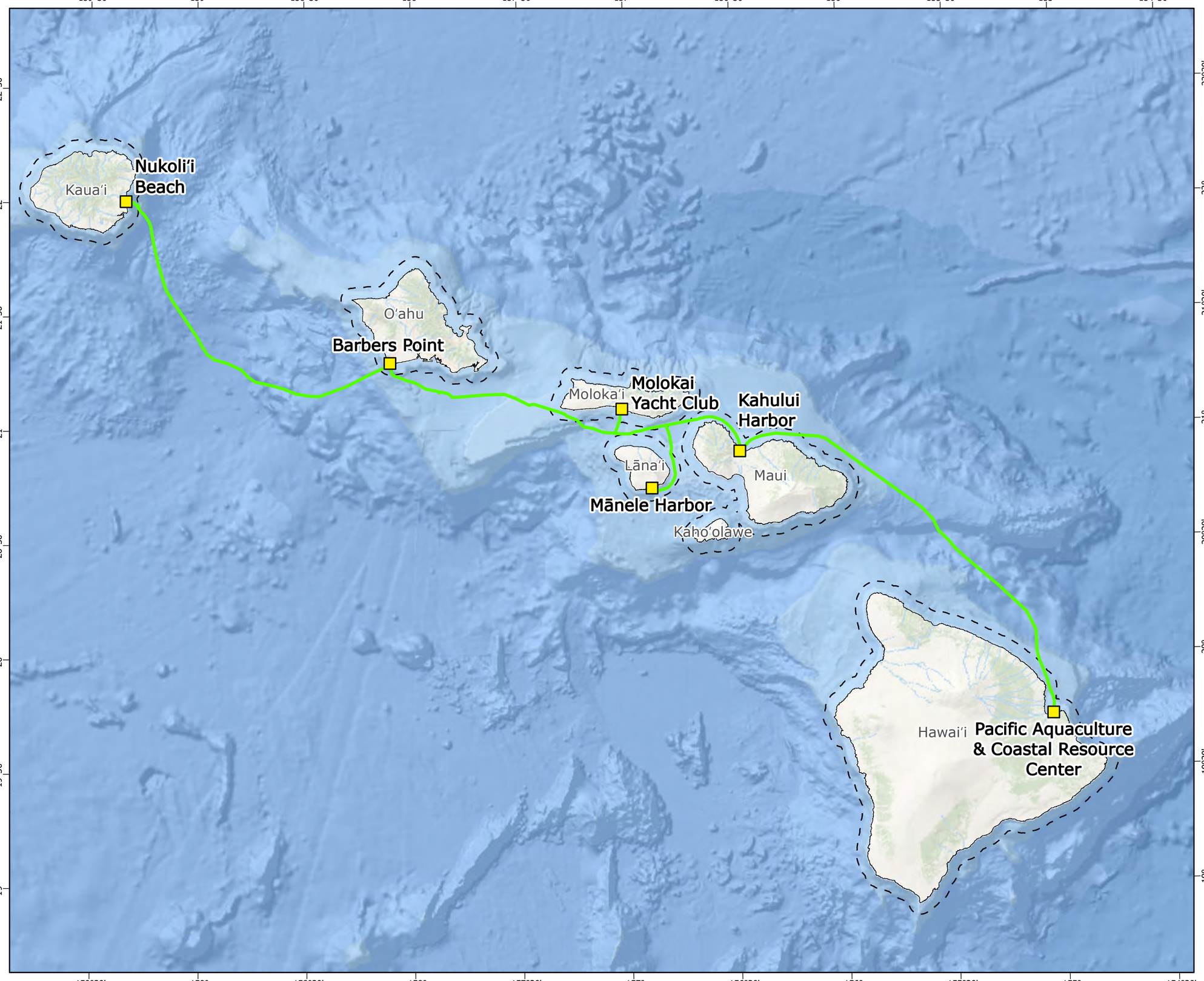
Wagner, W.L., D.R. Herbst, and D.H. Lorence. 2023. Flora of the Hawaiian Islands website. Accessed March 2025. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm.

WoRMS (World Register of Marine Species) Editorial Board. 2024. Accessed September 2024. https://www.marinespecies.org/aphia.php?p=search.

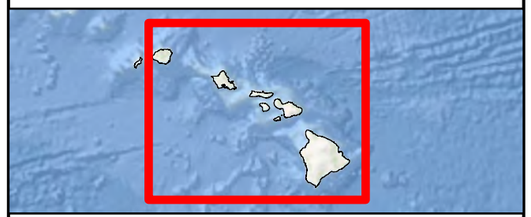
Figures

Hawaiian Islands Fiber Link

Figure 1
Project Overview



- Subsea Cable
- Cable Landing Site
- State Waters Limits (3 nautical miles)



0 20 40 80 120
Kilometers

0 10 20 40
Nautical Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\ProjectOverview_20240514\ONI_HIFL_ProjectOverview_20240801.aprx

-156°53'25"
-156°53'20"
-156°53'15"
20°44'35"
20°44'30"
20°44'25"

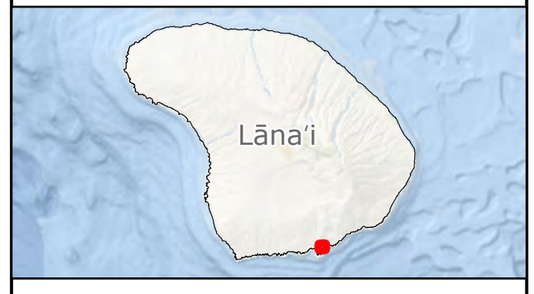
Mānele Road
Mānele Small Boat Harbor
(2)4-9-017:006
(2)4-9-017:027

Hawaiian Islands Fiber Link - Lānaʻi Cable Landing Site

Figure 2
Project Study Area and Vicinity

Study Area
TMK Parcel
Roads

The study area boundaries were developed using professional survey data to ensure proper alignment with the legal lot boundaries, where applicable. The publicly available TMK dataset is provided for context, but has varying spatial accuracy standards and may not perfectly match other data layers as specified in the underlying metadata.



0 0.02 0.04 0.06
Miles

0 100 200
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Lanai_20250812\ONI_HIFL_BioReport_Lanai_20250812.aprx

-156°53'25"
-156°53'20"
-156°53'15"
20°44'35"
20°44'30"
20°44'25"

Mānele Road

Mānele Small Boat Harbor

Hawaiian Islands Fiber Link - Lānaʻi Cable Landing Site

Figure 3
Soils within the Study Area

Study Area

Roads

NRCS Soil Symbol

JaC - Jaucas sand, 0 to 15 percent slopes

rSL - Sandy alluvial land

rVS - Very stony land

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.02 0.04 0.06

Miles

0 130 260

Feet

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Lanai_20250812\ONI_HIFL_BioReport_Lanai_20250812.aprx

Hawaiian Islands Fiber Link - Lānaʻi Cable Landing Site

Figure 4
Water Resources Mapped by NWI, NHD, and DAR



- Study Area
- Roads

National Wetlands Inventory

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Pond
- Riverine

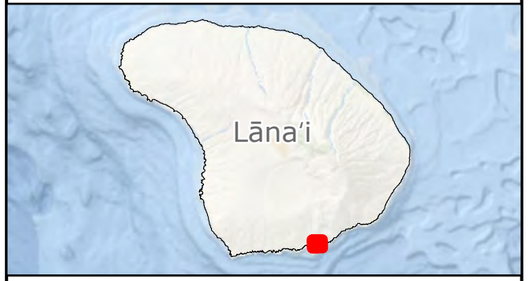
National Hydrography Dataset

- Intermittent Stream
- Waterbody

Division of Aquatic Resources

- Stream

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.04 0.08 0.1
Miles

0 200 400
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Lanai_20250812\ONI_HIFL_BioReport_Lanai_20250812.aprx

Hawaiian Islands Fiber Link - Lānaʻi Cable Landing Site

Figure 5
Critical Habitat Within the Study Area and Vicinity

-156°53'35" -156°53'30" -156°53'25" -156°53'20" -156°53'15" -156°53'10" -156°53'5"

20°44'40" 20°44'35" 20°44'30" 20°44'25" 20°44'20"

Mānele Road

Mānele Small Boat Harbor

Study Area

Roads

Proposed Green Sea Turtle *(Chelonia mydas)* Critical Habitat

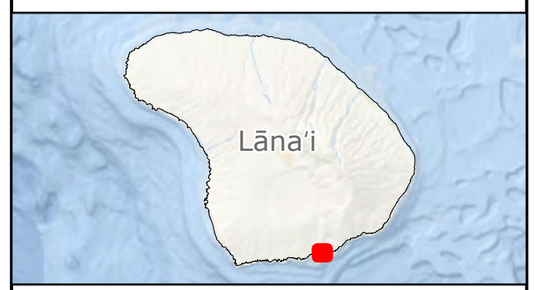
Marine

Monk Seal *(Neomonachus schauinslandi)* Critical Habitat

Marine

Terrestrial (extends from water's edge inland 16 feet [5 m] past shoreline)

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.04 0.08 0.1
Miles

0 260 520
Feet

N W E S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksIncHawaiian_Islands_Fiber_Link\Maps\BioReport_Lanai_20250812.aprx

Appendix A

Representative Photographs of the Study Area



Photo 1. Looking south across Mānele Road depicting Landscaped Areas comprised of mowed lawns and ornamental plantings around the harbor master's office and associated parking areas. Lat/Long: 20.741965, -156.889227.



Photo 2. Looking east depicting Landscaped Areas around the harbor master's office and associated parking areas in the central portion of the Study Area. Lat/Long: 20.741365, -156.889285.



Photo 3. Looking north along the western boundary of the Study Area, depicting the western portion of the Study Area with paved roads, parking, and landscaped areas around the harbor master's office. Lat/Long: 20.740801, -156.889255.



Photo 4. Looking west along the southern boundary of the Study Area, depicting Kiawe/ Buffelgrass Forest. Lat/Long: 20.741257, -156.887785.



Photo 5. Looking east into the Study Area, depicting Landscaped Area vegetation (foreground) and Kiawe/ Buffelgrass Forest (right; background) between which is a paved road, boat launch, and breakwater. Lat/Long: 20.74112, -156.888523.



Photo 6. Looking northeast depicting, rocky shoreline along the coast along the eastern Study Area boundary. Lat/Long: 20.741458, -156.88769.

Hawaiian Islands Fiber Link Project –
Hilo Cable Landing Site, Hawai‘i Island

Biological Resources Survey Report

Prepared for:
Ocean Networks, Inc. (ONI)

Revised January 2026

TETRA TECH

complex world | CLEAR SOLUTIONS™

Table of Contents

1.0 Introduction 1
1.1 Project Description 1
2.0 Description of the Study Area 2
2.1 Climate 2
2.2 Topography and Soils 3
2.3 Surface Waters 3
2.4 Critical Habitat for Listed Species 4
3.0 Methods 4
3.1 Plants 5
3.2 Wildlife 5
3.2.1 Birds 5
3.2.2 Terrestrial Mammals 5
3.2.3 Invertebrates 6
3.2.4 Sea Turtles and Marine Mammals 6
4.0 Results and Discussion 6
4.1 Plants 8
4.2 Wildlife 9
4.2.1 Birds 9
4.2.2 Terrestrial Mammals 11
4.2.3 Invertebrates 12
4.2.4 Sea Turtles and Marine Mammals 13
4.2.5 Aquaculture Organisms 13
5.0 Conclusions and Recommendations 13
5.1 General 14
5.2 Plants 14
5.3 Wildlife 14
5.3.1 Nēnē 14
5.3.2 Listed Waterbirds 15

5.3.3 Listed Seabirds 15
5.3.4 Hawaiian Hawk 16
5.3.5 Hawaiian Hoary Bat 16
5.3.6 Sea Turtles and Marine Mammals 16
6.0 References 17

List of Tables

Table 1. Monthly Rainfall at Hilo Airport Gage Prior to and During the Surveys 3
Table 2. Federally or State-listed Species with the Potential to Occur in the Study Area 7
Table 3. Bird Species Recorded in the Study Area and Immediate Vicinity 10
Table 4. Invertebrate Taxa Recorded in the Study Area 12

List of Figures

Figure 1. Project Overview
Figure 2. Project Study Area and Vicinity
Figure 3A. Project Study Area: PACRC
Figure 3B. Project Study Area: UH Hilo
Figure 4A. Soils: PACRC
Figure 4B. Soils: UH Hilo
Figure 5A. Water Resources Mapped by NWI, NHD, and DAR: PACRC
Figure 5B. Water Resources Mapped by NWI, NHD, and DAR: UH Hilo
Figure 6. Critical Habitat Within the Study Area and Vicinity

List of Appendices

Appendix A. Representative Photographs of the Study Area

1.0 Introduction

The Hawaiian Islands Fiber Link (HIFL) Project is a proposed interisland submarine fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the State of Hawai‘i. The Project would interconnect the six main Hawaiian Islands, with cable landing sites on Kaua‘i, O‘ahu, Maui, Lāna‘i, Molokai, and Hawai‘i Island.

Tetra Tech was contracted to conduct a general biological survey within the 4.8-acre (1.9 hectare [ha]) terrestrial study area for the Hilo cable landing site. The purpose of the survey was to characterize the species and habitats present, and to determine whether state or federally-listed threatened or endangered species (pursuant to the federal Endangered Species Act or Hawai‘i Revised Statutes [HRS] Chapter 195D), or otherwise rare plants or animals have the potential to occur and could be impacted by construction or operation of the Project. This report summarizes the results of the biological surveys conducted within the study area by Tetra Tech on June 26, 2024 and December 18, 2024.

1.1 Project Description

The HIFL Project involves construction, operation, and maintenance of an interisland fiber optic cable system that would interconnect the six main Hawaiian Islands to provide more robust, diverse, and reliable broadband connectivity throughout the state. The fiber optic cable system would distribute high-speed broadband to each island, with cable landing sites strategically located on Kaua‘i (Nukoli‘i Beach), O‘ahu (Barbers Point), Maui (Kahului), Lāna‘i (Mānele Harbor), Molokai (Molokai Yacht Club), and Hawai‘i Island (Hilo). The overall extent of the Project is shown in Figure 1.

The system would include both marine and terrestrial components, with the marine component comprising approximately 416 miles (669 kilometers [km]) of fiber optic cable surface-laid on the seabed between the islands. The cable would have a maximum diameter of approximately 1.1 inches (28 millimeters [mm]) and would be installed in five distinct segments spanning the nearshore state waters and surrounding U.S. federal waters.

At the Hilo cable landing site, a subsurface borehole would be installed using horizontal directional drilling (HDD) to allow the subsea fiber optic cable(s) to traverse under the shoreline, as well as to facilitate crossing of buried wastewater utility pipes. The terrestrial components that would be constructed within the Study Area would include a beach manhole (BMH), land-based cable (terrestrial cable), and a cable landing station (CLS). The BMH would be a below-ground reinforced concrete vault (or similar) and would serve as the connection chamber between the subsea cable and the terrestrial cable. From the BMH, the terrestrial cable would be installed in underground conduit to a manhole installed adjacent to a nearby utility pole. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, extending along state and county roadways as well as via existing underground conduit to University of Hawai‘i (UH) Hilo.[1] The CLS for this site would be a

[1] The segment of terrestrial fiber on the existing utility system is described herein to provide an overview of the entire system but is not further addressed by this study because it comprises existing third-party infrastructure.

new modular structure constructed on the northern side of the UH Hilo campus near Lanikāula Street. The CLS would house cable operation and monitoring equipment and facilitate interconnection with the local telecommunications network. Additional underground conduit would be installed from the CLS to an adjacent building on the UH Hilo campus to connect the Project with the exiting telecommunication and utility network.

2.0 Description of the Study Area

As shown in Figure 2, the Study Area is located in Hilo on the eastern side of Hawai'i Island. It encompasses 4.8 acres (1.9 ha) and is comprised of two non-contiguous areas: the cable landfall area at the Pacific Aquaculture and Coastal Resource Center (PACRC) at Keaukaha and the CLS at the UH Hilo campus. The PACRC portion of the Study Area is east of the Hilo Harbor breakwater, west of Keaukaha Beach Park, north of Kalaniana'ole Street, and south of Puhi Bay (Figure 3A). It includes portions of five tax map keys (TMK): (3)2-1-011:005 (por.; owned by Department of Hawaiian Home Lands), (3)2-1-011:004 (por.; owned by UH), (3)2-1-011:010 (por.; owned by the State of Hawai'i and assigned to the County of Hawai'i via Executive Order), and (3)2-1-009:001 (por.) and (3)2-1-009:041 (por.), both owned by the State of Hawai'i and assigned to UH via Executive Order. PACRC is a research and education facility focused on aquaculture and resource management that was built at the former Hilo wastewater treatment facility (UH Hilo PACRC 2001). The CLS portion of the Study Area is within the UH Hilo campus within TMK (3)2-4-001:167, which is owned by the State of Hawai'i (Figure 3B). The CLS portion of the Study Area is immediately north of the Edith Kanaka'ole Building and includes portions of Life Science Buildings and Wentworth Hall.[2]

2.1 Climate

The climate in the Study Area is characterized as moderately wet (Price et al. 2012). The closest functioning National Weather Service (NWS) rainfall gage to the Study Area is at the Hilo Airport, located 0.8 miles (1.3 km) southwest from PACRC and 2.5 miles (4 km) northeast of the CLS at the UH Hilo campus. The monthly rainfall totals recorded at the gage prior to and during the surveys are shown in Table 1. The year-to-date total for this gage through the end of June 2024 was 95 percent of average, and the total at the end of December 2024 was 83 percent of average (NWS 2025). In June, drought conditions expanded into East Hawai'i including in the vicinity of the Study Area (NWS 2024a), and by mid-December 2024 conditions within the Study Area were classified as abnormally dry (NWS 2024b), suggesting dry conditions during the surveys.

[2] Existing buildings were not included in the survey for biological resources because the Project would not involve any new infrastructure or associated ground disturbance in the buildings.

Table 1. Monthly Rainfall at Hilo Airport Gage Prior to and During the Surveys

Date	Rainfall Total; Percentage of Average
April 2024	13.41 inches; 143%
May 2024	9.75 inches; 139%
June 2024	3.55 inches; 53%
July 2024	4.84 inches; 52%
August 2024	11.56 inches; 102%
September 2024	6.75 inches; 78%
October 2024	8.17 inches; 80%
November 2024	13.36 inches; 93%
December 2024	3.36 inches; 28%
Sources: NWS 2025 Note: Months when surveys occurred are highlighted in light grey.	

2.2 Topography and Soils

The Study Area is comprised of moderate to flat slopes with elevations ranging from sea level to approximately 140 feet (43 m) above mean sea level, at the PACRC and UH Hilo portions of the Study Area (respectively). In the PACRC portion of the Study Area, the topography changes sharply at the shoreline with the occurrence of an approximately 9-foot (3 m) tall slope comprised of lava rock, boulders, and cobbles, some of which were bound by concrete material to prevent erosion.

The Natural Resources Conservation Service (NRCS) characterizes the soils within the PACRC portion of the Study Area as consisting entirely of ʻOphikao-Urban land complex, 2 to 20 percent slopes (Figure 4A; NRCS 2024). Soils within the UH Hilo portion of the Study Area are comprised of Keaukaha highly decomposed plant material, 2 to 20 percent slopes, and Panaʻewa-Urban land complex, 2 to 10 percent slopes (Figure 4B; NRCS 2024). ʻOphikao-Urban land complex and Keaukaha highly decomposed plant material are both comprised of highly decomposed plant material over bedrock and characterized as well-draining with high runoff (NRCS 2024). Panaʻewa-Urban land complex is comprised of very cobbly hydrous loam, extremely stony hydrous loam and bedrock and is characterized as moderately well drained with high runoff (NRCS 2024).

2.3 Surface Waters

The Study Area is situated within the Wailoa watershed which encompasses roughly 178 square miles (461 km^2) (CWRM 2019, CWRM 2022). Streams and other waterbodies identified by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data (USFWS 2024a), the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD; USGS 2023), and the State of Hawaiʻi Division of

Aquatic Resources (DAR) dataset (DAR 2008) for the PACRC and UH Hilo portions of the Study Area are shown in Figure 5A and 5B, respectively.

At PACRC, NHD identifies two waterbodies (classified as reservoirs) within the Study Area (Figure 5A; USGS 2023). These circular features are PACRC's aquaculture tanks. NWI also identifies an estuarine and marine wetland immediately north of the PACRC Study Area, as well as Puhi Bay and the Pacific Ocean, which are classified as estuarine and marine deepwater (Figure 5A; USFWS 2024a).

No water features are identified within the UH Hilo portion of the Study Area. The perennial Waiākea Stream is mapped roughly 0.2 miles (0.3 km) to the west of the Study Area (Figure 5B). NWI (USFWS 2024a) also maps a freshwater emergent wetland and riverine feature to the west, and NHD (USGS 2023) identifies an intermittent tributary of Waiākea Stream to the southwest of the Study Area (Figure 5B). The DAR dataset also identifies Wailoa River roughly 0.2 miles (0.3 km) to the southeast of the CLS portion of the Study Area (Figure 5B; DAR 2008).

2.4 Critical Habitat for Listed Species

The National Oceanic and Atmospheric Administration (NOAA) has proposed marine critical habitat for the Central North Pacific distinct population segment of the threatened green sea turtle/ honu (*Chelonia mydas*) along the coastline at the PACRC portion of the Study Area (Figure 6). Proposed marine critical habitat includes all waters surrounding the island from the mean high water line to 66 foot (20 m) water depth (NOAA 2023a). No terrestrial critical habitat for the green sea turtle is proposed in the immediate vicinity; the closest terrestrial proposed critical habitat for the green sea turtle is approximately 1.3 miles (2.1 km) east of PACRC (USFWS 2023a).

Critical habitat for the endangered Hawaiian monk seal/ ʻĪlio-holo-i-kauaua (*Neomonachus schauinslandi*) has been designated along the coastline in the Study Area and in the marine waters (Figure 6). The marine portion of the monk seal critical habitat encompasses the marine habitat surrounding the island out to the 656 foot (200 m) bathymetric contour (Figure 6; NOAA 2015). Terrestrial critical habitat for monk seals is designated along the northern edge of the Study Area and includes the water's edge and inland 16.4 feet (5 m).

The false killer whale (*Pseudorca crassidens*) also has critical habitat designated in marine waters around portions of Hawai'i Island, including marine areas roughly 1.9 miles (3 km) offshore of the Study Area at the 148-foot (45-m) bathymetric contour (NOAA 2023b). No critical habitat for threatened or endangered plants or terrestrial wildlife has been designated by the USFWS within the Study Area or the vicinity (USFWS 2025).

3.0 Methods

Prior to the field surveys, Tetra Tech conducted a review of relevant publicly available literature and data with respect to biological resources in and near the Study Area. This review included environmental assessments and environmental impact statements, NWI and NHD data, scientific journals and reports, the USFWS Information for Planning and Consultation (IPaC) tool, and available, unpublished data

relevant to the natural history and ecology of the area. In addition, Tetra Tech reviewed available geospatial data, aerial photographs, and topographic maps of the area to identify occurrences of state or federally-listed species, or habitats that could harbor these species. The biological field surveys were conducted by Tetra Tech on June 26, 2024 and December 18, 2024. Details regarding the field survey methodologies are provided below.

3.1 Plants

Pedestrian surveys were conducted to identify and record common plant species and dominant vegetation types, as well as rare or listed plant species within the Study Area. Areas more likely to support native plants (e.g., rocky outcrops and shady areas) were more intensively examined. Plant identifications were made in the field; plants that could not be positively identified were photo-documented for comparison with the recent taxonomic literature.

Plants recorded during the surveys are indicative of the season and environmental conditions at the time of the surveys. The presence and location of plants can be influenced by seasonal and temporal changes; therefore, it is possible additional species may occur within the Study Area but were not present during these surveys.

The taxonomy and nomenclature of plants are in accordance with Wagner et al. (2023). Common/ Hawaiian names are provided first, followed by scientific names in parentheses. If no common or Hawaiian name is known, only the scientific name is provided.

3.2 Wildlife

Wildlife surveys consisted of observations and identification of birds, terrestrial and marine mammals, and conspicuous invertebrate species encountered while searching the Study Area. Tetra Tech recorded all wildlife seen or heard while walking within the Study Area coupled with visual observation of scat, tracks, and other animal sign. Habitats or plants that could support listed wildlife species were also identified if present (such as host plants for listed invertebrates or water features as potential habitat for listed Hawaiian waterbirds). Specific survey methods for each wildlife group are provided below.

3.2.1 Birds

All birds seen or heard while walking and driving within the Study Area were recorded. Habitats or plants that could support listed birds were also identified if present (e.g., water features as potential habitat for listed Hawaiian waterbirds). Scientific nomenclature for birds follows Birds of the World (Billerman et al. 2022).

3.2.2 Terrestrial Mammals

The terrestrial mammal surveys were limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign while walking within the Study Area. Scientific names for mammals follow Tomich (1986).

Ultrasonic bat recorders were not deployed for the endangered Hawaiian hoary bat/ ʻōpeʻapeʻa (*Lasiurus semotus*) as part of the survey. Rather, as USFWS and State of Hawaiʻi Division of Forestry and Wildlife (DOFAW) recognize all woody vegetation greater than 15 feet (4.6 m) tall as potential bat roosting habitat (DOFAW 2015, USFWS 2023b), the presence/absence of suitable bat foraging and roosting habitat within the Study Area was noted.

3.2.3 Invertebrates

Incidental observations of large or conspicuous invertebrates were recorded incidentally to wildlife surveys while walking through the Study Area. Invertebrates were identified through visual observations and were not collected as specimens in the field. Scientific nomenclature for terrestrial invertebrates follows Nishida (2002), and follows WoRMS Editorial Board (2024) for marine invertebrates.

3.2.4 Sea Turtles and Marine Mammals

This survey focused on characterizing the nearshore marine and shoreline habitat for listed sea turtles and protected marine mammals (e.g., monk seals) and was limited to visual observations from the shoreline using binoculars. Biologists scanned the nearshore marine waters and suitable nearshore terrestrial habitat for individuals or their potential habitat.

4.0 Results and Discussion

The biological resources in both the PACRC and UH Hilo portions of the Study Area have been highly modified by historic and current land uses and the introduction of invasive species. These modifications have reduced the number and abundance of native plant species and habitats suitable for native species. Portions of the Study Area have paved roads, parking areas, and infrastructure associated with operations at the PACRC and UH Hilo facilities, including several aquaculture tanks at PACRC. Representative photographs from the surveys are presented in Appendix A.

No federally or state-listed species were observed during the surveys. Although not observed in the Study Area during the surveys, several listed animal species, including the Hawaiian hoary bat, Hawaiian goose/ nēnē (*Branta sandvicensis*), listed waterbirds, listed seabirds, and Hawaiian hawk/ ʻio (*Buteo solitarius*), may occur in or traverse the Study Area. Listed species with the potential to occur in the Study Area are summarized in Table 2 and are discussed in further detail below.

Table 2. Federally or State-listed Species with the Potential to Occur in the Study Area

Common/Hawaiian Name(s)	Scientific Name	Listing Status[1]	Critical Habitat in Study Area	Potential Occurrence in Study Area
Birds				
Hawaiian coot/ ʻalae keʻo keʻo	*Fulica alai*	SE, FE	None Designated	No suitable nesting habitat present, but may occasionally occur in or fly over the Study Area.
Hawaiian stilt/ aeʻo	*Himantopus mexicanus knudseni*	SE, FE	None Designated	No suitable nesting habitat present, but may occasionally occur in or fly over the Study Area.
Hawaiian goose/ nēnē	*Branta sandvicensis*	SE, FT	None Designated	No suitable nesting habitat present, but may use mowed lawns within and adjacent to the Study Area for foraging and loafing, or may fly over.
Hawaiian hawk/ ʻio	*Buteo solitarius*	SE	None designated	Nesting habitat present in the UH Hilo portion of the Study Area but of poor quality due to predator abundance; may occasionally occur in or fly over the Study Area.
Hawaiian petrel/ ʻuaʻu	*Pterodroma sandwichensis*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (between March and December).
Newell's shearwater/ ʻaʻo	*Puffinus auricularis newelli*	ST, FT	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (March and December).
Band-rumped storm-petrel/ ʻakēʻakē	*Hydrobates castro*	SE, FE	None Designated	No suitable nesting habitat, but could fly over the Study Area at night when traveling between the ocean and upland areas during the breeding, nesting, and fledging seasons (March and December).
Terrestrial Mammals				
Hawaiian hoary bat/ ʻōpeʻapeʻa	*Lasiurus semotus*	SE, FE	None Designated	Could traverse or forage in the Study Area or roost in vegetation > 15 feet in height.
Sea Turtles and Marine Mammals				
Green sea turtle/ honu	*Chelonia mydas*	ST, FT	Proposed marine within PACRC	Not known to nest in the Study Area but could forage offshore.
Hawaiian monk seal/ ʻīlio-holo-i-kauaua	*Neomonachus schauinslandi*	SE, FE	Terrestrial within and marine in immediate vicinity of PACRC	Could haul out in the Study Area and vicinity along coast or forage offshore.

1. FE = Federally endangered; SE = State endangered; FT = Federally threatened; ST = State threatened.

4.1 Plants

No federal or state listed threatened, endangered, proposed listed, or candidate plant species were observed in the Study Area during the biological surveys. The Study Area is dominated by non-native plants. Only two native plant species—*Cyperus polystachyos* and naupaka kahakai (*Scaevola taccada* subsp. *taccada*)—were recorded in the Study Area. These species are indigenous to and common throughout the Hawaiian Islands (Wagner et al. 2023).

PACRC Portion of the Study Area

Vegetation in the PACRC portion of the Study Area is characterized by Landscaped Areas and Coastal Strand.

Landscaped Areas: This vegetation type dominates the PACRC portion of the Study Area and is characterized by maintained lawns with ornamental plantings around buildings, roads, and fenceline edges and agricultural crops planted in discrete areas (Appendix A, Photos 1 – 3). Various weedy plant species are interspersed throughout. The lawn is dominated by Hilo grass (*Paspalum conjugatum*). The following plants are present within and along the lawn edges: Guinea grass (*Megathyrsus maximus*), *Oplismenus compositus*, *Sporobolus* sp., *Cyperus polystachyos*, *Cyperus mindorensis*, McCoy grass (*Cyperus gracilis*), *Eleocharis* sp., natal red top (*Melinis repens*), hairy spurge (*Euphorbia hirta*), graceful spurge (*Euphorbia hypericifolia*), tick clover (*Grona triflora*), buttonweed (*Spermacoce remota*), *Spermacoce exilis*, nodeweed (*Synedrella nodiflora*), niruri (*Phyllanthus debilis*), partridge pea (*Chamaecrista nictitans*), maile pilau (*Paederia foetida*), little bell (*Ipomoea triloba*), and sensitive plant (*Mimosa pudica* var. *unijuga*). Plantings of ornamental herbs, shrubs, and small trees include wedelia (*Sphagneticola trilobata*), gardenia (*Gardenia augusta*), Chinese hibiscus (*Hibiscus rosa-sinensis*), *Clerodendrum quadriloculare*, fiddlewood (*Citharexylum caudatum*), and the Polynesian-introduced tī (*Cordyline fruticosa*). Cultivated agricultural crops are growing in small, discrete areas in the southern portion of the PACRC and include kalo (*Colocasia esculenta*), sugar cane (*Saccharum officinarum*), cassava (*Manihot esculenta*), aloe vera (*Aloe vera*), and tomato (*Solanum lycopersicum*). False kamani (*Terminalia catappa*) trees up to 20 feet (6 m) tall and coconut palms/ niu (*Cocos nucifera*) up to 30 feet (9 m) in height occur along the northern boundary of the Study Area. The indigenous sedge *Cyperus polystachyos* is rare in occurrence within this vegetation type.

Coastal Strand: This vegetation type occurs in small patches of sandy soil in the area between the lawn and rocky shoreline (Appendix A, Photo 4). Species within this vegetation type are few and comprised of the native naupaka kahakai (*Scaevola taccada* var. *taccada*), as well as non-native coconut palms and false kamani trees. Although not occurring within the Study Area, the indigenous hala (*Pandanus tectorius*) was observed near the shoreline immediately adjacent to the Study Area.

UH Hilo Portion of the Study Area

Vegetation in the UH Hilo portion of the Study Area is comprised of Landscaped Areas.

Landscaped Areas: Landscaped Areas comprise the entirety of the vegetation within the UH Hilo portion of the Study Area. This vegetation type consists of maintained lawns within which or along the edges of

are various ornamental shrub species and large trees up to 45 feet (13.7 m) tall (Appendix A, Photos 5 – 8). The lawns are dominated by Bermuda grass (*Cynodon dactylon*), wide-leaved carpetgrass (*Axonopus compressus*), Hilo grass, and other *Paspalum* grasses, with natal red top present in some peripheral areas. Trees planted in the area include banana (*Musa* sp.), coconut palm, MacArthur palm (*Ptychosperma macarthurii*), areca palm (*Dypsis lutescens*), fishtail palm (*Caryota* sp.), *Macaranga tanarius*, fern tree (*Filicium decipiens*), octopus tree (*Schefflera actinophylla*), African tulip (*Spathodea campanulata*), autograph tree (*Clusea rosea*), *Tabebuia heterophylla*, and paperbark (*Melaleuca quinquenervia*). Weedy plants growing within and on the edges of landscaping include rabbit's foot fern (*Phlebodium aureum*), silver fern (*Pityrogramma calomelanos*), artillery plant (*Pilea microphylla*), pink wood sorrel (*Oxalis debilis*), yellow wood sorrel (*Oxalis corniculata*), niruri, hairy spurge, *Salvia* sp., milkwort (*Polygala paniculata*), maile honohono (*Ageratum conyzoides*), pilipili (*Drymaria cordata* var. *pacifica*), oriental hawksbeard (*Youngia japonica*), obscure morning glory (*Ipomoea obscura*), maile pilau, bearded begonia (*Begonia hirtella*), wishbone flower (*Torenia asiatica*), mother-in-law's tongue (*Dracaena trifasciata*), nightshade (*Solanum americanum*), and butterfly bush (*Buddleja asiatica*). No native plant species were observed within the UH Hilo portion of the Study Area.

4.2 Wildlife

4.2.1 Birds

Twenty bird species were recorded within the Study Area and immediate vicinity during the surveys (Table 3). Of these, four species—the black-crowned night heron/ auku'u (*Nycticorax nycticorax*), ruddy turnstone/ 'akekeke (*Arenaria interpres*), Pacific golden-plover/ kōlea (*Pluvialis fulva*), and wandering tattler/ 'ūlili (*Tringa incana*)—are native to the Hawaiian Islands; these native birds were observed at or in the vicinity of the PACRC site, and are protected by the Migratory Bird Treaty Act (MBTA). The remaining species are non-native and commonly found in urban, rural, or agricultural areas. The most common bird species recorded during the surveys were the warbling white eye (*Zosterops japonicus*), saffron finch (*Sicalis flaveola*), and common myna (*Acridotheres tristis*). Although no federal or state listed bird species were observed, several listed birds have the potential to occur in or traverse the Study Area. These listed species are discussed below.

Table 3. Bird Species Recorded in the Study Area and Immediate Vicinity

Common/ Hawaiian Name	Scientific Name	Status	PACRC	CLS
Black-crowned night heron/ auku'u	*Nycticorax nycticorax* [1]	I	✓	
Cattle egret	*Bubulcus ibis* [1]	NN		✓
Common myna	*Acridotheres tristis*	NN	✓	✓
Common waxbill	*Estrilda astrild*	NN	✓	✓
Domestic chicken	*Gallus domesticus*	NN	✓	✓
House finch	*Haemorhous mexicanus* [1]	NN	✓	
House sparrow	*Passer domesticus*	NN	✓	
Java sparrow	*Padda oryzivora*	NN		✓
Pacific golden-plover/ kōlea	*Pluvialis fulva* [1]	M	✓	
Northern cardinal	*Cardinalis cardinalis* [1]	NN	✓	✓
Rock pigeon	*Columba livia*	NN	✓	✓
Ruddy turnstone/ 'akekeke	*Arenaria interpres* [1]	M	✓	
Saffron finch	*Sicalis flaveola*	NN	✓	✓
Scaly-breasted munia	*Lonchura punctulata*	NN	✓	
Spotted dove	*Spilopelia chinensis*	NN	✓	✓
Warbling white-eye	*Zosterops japonicus*	NN	✓	✓
Wandering tattler/ 'ūlili	*Tringa incana* [1]	M	✓	
Yellow-billed cardinal	*Paroaria capitata*	NN	✓	✓
Yellow-fronted canary	*Crithagra mozambica*	NN		✓
Zebra dove	*Geopelia striata*	NN	✓	✓

Status: NN = Non-native established species, I = Indigenous, M = Migrant.

[1] MBTA = Protected by the Migratory Bird Treaty Act.

Hawaiian Goose/ Nēnē: Nēnē use various habitat types ranging from coastal to subalpine environments, including shrublands, grasslands, beach strand, and lava rock (Banko et al. 2020). They are known to use golf courses, grazed agricultural areas, playing fields, and lawns. Although they are not obligate waterbirds, nēnē also use wetlands, reservoirs, and streams, and often migrate seasonally between high-elevation shrublands during the non-breeding season to lower-elevation breeding and molting areas (Hess et al. 2012). Nesting occurs in a variety of habitats, but typically nests are well concealed under shrubs (Banko et al. 2020).

Although no nēnē were observed during the surveys, nēnē have been recorded nearby the Study Area in Keaukaha (eBird 2021) and may fly over or occasionally visit the Study Area to forage on mowed grass or visit the aquaculture tanks.

Listed Waterbirds: No listed waterbirds were observed in the Study Area during the surveys and no suitable nesting habitat is available in the Study Area. Although unlikely, it is possible listed Hawaiian waterbirds could occasionally occur in or fly over the Study Area. This includes the Hawaiian coot/ ʻalae keʻokeʻo (*Fulica alai*) and Hawaiian stilt/ aeʻo (*Himantopus mexicanus knudseni*).[3] Hawaiian coots and stilts have been recorded at nearby wetlands, such as Onekahakana Beach Park and Loko Waka Pond (eBird 2021), and are unlikely to regularly use the Study Area because of the more suitable habitat in the vicinity.

Hawaiian Hawk/ ʻIo: The state-listed ʻio is restricted to Hawaiʻi Island. This raptor nests in large trees, primarily in native ʻōhiʻa lehua (*Metrosideros polymorpha*) trees, between March and September. ʻIo are non-migratory and defend their territory year-round (Clarkson and Laniawe 2020). Although no ʻio were observed during the surveys, ʻio have been observed on the UH Hilo campus (eBird 2021) and the species may traverse the Study Area. No ʻio nests were incidentally observed in or adjacent to the Study Area. Although the large trees in the UH Hilo portion of the Study Area could be used for nesting, the UH Hilo campus is not ideal for ʻio due to the prevalence of feral cats in the area.

Listed Seabirds: The endangered Hawaiian petrel/ ʻuaʻu (*Pterodroma sandwichensis*), threatened Newell's shearwater/ ʻaʻo (*Puffinus newelli*), and endangered band-rumped storm-petrel/ ʻakēʻakē (*Hydrobates castro*) (collectively referred to as listed seabirds) have not been documented in or close to the Study Area. On Hawaiʻi Island, these listed seabirds nest in underground burrows, lava crevices, and under vegetation in primarily subalpine remote areas characterized by pit craters and old lava flows and dominated by native vegetation (Ainley et al. 2020, Simons and Bailey 2020, Carboneras et al. 2021). These seabirds typically return to the same nesting sites each year. The closest known breeding area for these species is in lower Puna (Reynolds and Richotte 1997). Listed seabirds have the potential to fly over the Study Area at night between March and December while transiting between nesting burrows, prospecting sites, and the ocean. These species are known to be attracted to outdoor lights at night; after circling the lights, they can become exhausted and collide with nearby structures or fall to the ground (USFWS 2023b).

4.2.2 Terrestrial Mammals

Small Indian mongoose (*Herpestes auropunctatus*) and feral cats (*Felis catus*) were seen during the surveys. Although not directly observed, other introduced mammals, such as house mice (*Mus musculus*), rats (*Rattus* spp.), and dogs (*Canis familiaris*) are likely to occur within the Study Area.

[3] Research has shown that purebred Hawaiian ducks/ koloa (*Anas wyvilliana*) only occur on Kauaʻi Island (Pacific Birds 2024).

Hawai'i's only native, extant terrestrial mammal—the endangered Hawaiian hoary bat—may transit or forage in portions of the Study Area. This species will forage in open and semi-cluttered landscapes in a wide range of habitats and vegetation types such as in open areas, at forest edges or within gaps, and over open water bodies including streams, ponds, and along shorelines (Jacobs 1994, Jacobs 1999, Bonaccorso et al. 2015, Pinzari et al. 2019). Hawaiian hoary bats are tree-roosting bats and roost in various native and non-native trees (USFWS 1998, Gorresen et al. 2013, Montoya-Aiona et al. 2023). On Hawai'i Island, this species is known to concentrate in the coastal lowlands in the summer months and migrate to the interior highlands during the winter months (Gorresen et al. 2013). Although there are minimal trees within the PACRC site, there are several trees over 15 feet (4.6 m) tall (false kamani, coconut palms, and fiddlewood) that have the potential to function as bat roost trees. Large trees within the UH Hilo campus sites (e.g., octopus tree, African tulip, autograph tree) also have the potential to function as bat roost trees due to their size (DOFAW 2015, USFWS 2023b). Thus, Hawaiian hoary bats may transit, roost, or forage in portions of the Study Area.

4.2.3 Invertebrates

Invertebrates incidentally observed during the surveys are listed in Table 4. Along the shoreline at PACRC, two native marine invertebrate taxa were observed; endemic marine gastropods, known as 'opihi (*Cellana* sp.), and indigenous 'a'ama crabs (*Grapsus tenuicrustatus*) were recorded. Shore flies (Ephydridae) were abundant within the PACRC portion of the Study Area. These flies could not be identified to genus, but many shore flies are native to Hawai'i. No native invertebrates were observed within the UH Hilo portion of the Study Area during the surveys.

Table 4. Invertebrate Taxa Recorded in the Study Area and Immediate Vicinity

Common/ Hawaiian Name	Scientific Name	Status	PACRC	CLS
'A'ama crab	*Grapsus tenuicrustatus*	I	✓	
Ants	Formicidae*	NN	✓	
Asian tiger mosquito	*Aedes albopictus*	NN	✓	
Earwig	Dermaptera*	NN	✓	✓
Flower ant	*Monomorium floricola*	NN	✓	✓
Grasshopper	*Oedaleus* sp.	NN	✓	✓
'Opihi	*Cellana* sp.	E	✓	
Pea blue	*Lampides boeticus*	NN	✓	
Pill bug	Isopoda*	NN	✓	✓
Thrip	Thysanoptera*	NN	✓	✓
Wasp	Vespidae*	NN		✓
Shore fly	Ephydridae*	Unknown	✓	
Western honeybee	*Apis mellifera*	NN	✓	✓
Yellow fever mosquito	*Aedes aegypti*	NN	✓	

Status: E = Endemic, I = Indigenous, NN = Non-native species.

* = Represents order or family because lower taxonomic identification could not be made in the field.

4.2.4 Sea Turtles and Marine Mammals

No sea turtles, monk seals, or other marine mammals were observed in the Study Area during the surveys. Hawaiian monk seals spend most of their time in the ocean, but also haul out on land for resting, pupping, nursing, molting, and avoiding predators. Monk seals primarily haul out on sandy beaches, but also utilize coral rubble, rocky, and volcanic substrates (NMFS 2007, NOAA 2011). Tidepools, rocky outcrops, and sheltered shoreline adjacent to the PACRC portion of the Study Area provide potential basking or foraging habitat for monk seals, and this section of the coastline has been identified as a haul out area (NMFS 2014).

In Hawai‘i, green sea turtles mostly nest on sandy beaches close to where they were hatched (NOAA 2023a). Green sea turtles are not known to nest in the Study Area and there is no sandy beach in the Study Area. The closest known terrestrial site where green sea turtles occur is at Carl Smith Park (approximately 1.3 miles [2.1 km] east of the Study Area), which is an important basking location for green sea turtles and proposed terrestrial critical habitat for the species (USFWS 2023a). Green sea turtles often forage in shallow reefs throughout the main Hawaiian Islands where their food source is plentiful (Balazs et al. 1987). Algae could be observed in the nearshore marine habitat from the shoreline; therefore, it is possible green sea turtles could forage offshore.

The endangered hawksbill sea turtle (*Eretmochelys imbricata*) is a rare sea turtle species that uses similar feeding grounds to the green sea turtle (Gaos et. al. 2020) and nests on a wide range of substrates (USFWS 2023b). According to NOAA (2024), 10 to 25 female hawksbill sea turtles nest annually on beaches along the southern coast of the Hawai‘i Island. There is a lack of available information on the nesting and foraging locations for this species, but they have the potential to forage on the nearshore reef in the vicinity of the Study Area.

4.2.5 Aquaculture Organisms

Various aquatic plants and animals are cultivated in the aquaculture tanks within the PACRC portion of the Study Area. These include species of tilapia, mussels, coral, and algae (J. Reinicke, pers. comm. December 18, 2024). As these tanks are not expected to be affected by the Project, the organisms are not discussed further.

5.0 Conclusions and Recommendations

As described in Section 4, the majority of the plants and animals observed in the Study Area are non-native to the Hawaiian Islands. No federal and state listed species were observed during the biological surveys. Although not observed, several listed wildlife species have the potential to occasionally occur in or transit through the Study Area, particularly the Hawaiian hoary bat, nēnē, listed waterbirds, listed seabirds, and Hawaiian hawk. Recommended measures to avoid and minimize impacts to these species are outlined below.

5.1 General

In addition to the species-specific measures detailed below, Tetra Tech recommends the following general measures to avoid and minimize impacts to biological resources:

- Although non-native weedy species are common in the Study Area, invasive species minimization measures should be implemented to avoid unintentional introduction or transport of new invasive species to the area. This includes utilizing on-site gravel, rock, and soil (or purchasing from a local supplier) when practicable; utilizing certified, weed-free seed mixes; and washing construction equipment and/or visually inspecting for excessive debris, plant materials, and invasive or harmful non-native species as appropriate.
- Staff should be trained to identify listed wildlife or MBTA-protected birds that may be found onsite (e.g., listed seabirds) and to take appropriate steps if listed wildlife species are found.
- If any downed listed wildlife species are observed at the Project, USFWS and DOFAW should be notified as soon as possible.

5.2 Plants

No listed or rare native plant species were observed in the Study Area during the surveys. Overall, the vegetation in the Study Area is highly disturbed from historic and current land use activities, and only two native plant species were observed. Tetra Tech recommends the following with regards to plants:

- If landscaping is installed as part of the Project, use non-invasive plants and incorporate native plant species to the maximum extent practicable.

5.3 Wildlife

Nearly all the animal species recorded in the Study Area are not native to the Hawaiian Islands. Only two native birds and two native invertebrate taxa were recorded, and these species are relatively common throughout the Hawaiian Islands. In general, the habitat in the Study Area is not suitable for listed wildlife. However, several listed animal species have the potential to occasionally occur in or transit the Study Area.

5.3.1 Nēnē

Although their preferred habitat is not present within the Study Area, nēnē may fly through the Study Area to adjacent suitable habitat. Nēnē also have the potential to be attracted to existing habitat within the Study Area (i.e., mowed lawns). Should this species land within the Study Area, it could be impacted by construction activities. Tetra Tech recommends the following avoidance measures for nēnē (modified from USFWS [2023b] and DOFAW):

- Do not approach, feed, or disturb nēnē.

- If a nēnē is found in the Study Area during active construction, cease all activities within 100 feet (30 m) of the bird, and do not feed, approach, or disturb the bird. Work may continue after the bird leaves the area of its own accord.
- If nēnē are observed loafing or foraging within the Study Area during the breeding season (September through April), a biologist familiar with nesting behavior should survey for nests in the area prior to resuming construction activities. If a nest is discovered, contact USFWS and DOFAW and cease all work within 150 feet (46 m). If a nest is not discovered, work may continue after the bird leaves the area of its own accord.

5.3.2 Listed Waterbirds

No listed waterbirds were detected during the surveys, and habitat for listed waterbirds is low quality within the Study Area compared to areas in the vicinity. To avoid impacts to listed waterbirds during Project construction and operation, Tetra Tech recommends the following based on avoidance and minimization measures provided by USFWS (2023b):

- Avoid creating areas with standing water.
- If listed waterbirds are found in the Study Area during active construction, cease all activities within 100 feet (30 m) of the bird(s), and do not approach the bird(s). Work may continue after the bird leaves the area of its own accord.

5.3.3 Listed Seabirds

The Study Area does not provide suitable nesting or foraging habitat for the three listed seabirds. However, individuals may fly over the area during the breeding, nesting, and fledging seasons (March 1 - December 15) and may be attracted to nighttime lighting. Disorientation and fallout as a result of light attraction could occur for individuals attracted to unshielded nighttime lighting. Juvenile birds are particularly vulnerable to light attraction, and grounded birds are vulnerable to mammalian predators or vehicle strikes (Rodríguez et al. 2017). Tetra Tech recommends the following measures to avoid and minimize potential impacts to listed seabirds:

- If operational on-site lighting is required, it should consist of fixtures that will be shielded and/or directed downward to prevent upward radiation, triggered by a motion detector, and fitted with non-white light bulbs to the extent possible.
- Avoid the use of nighttime lighting that could attract seabirds during the seabird peak fallout period (September 15 - December 15).
- If a grounded seabird is found at the Project, notify USFWS and DOFAW immediately. These agencies may recommend contacting a wildlife habitation facility such as the Hawai‘i Wildlife Center at (808) 884-5000.
- Minimize construction of overhead lines to reduce the collision risk for seabird species.

5.3.4 Hawaiian Hawk

The state-listed Hawaiian hawk is not expected to nest in the Study Area, but it may traverse the Study Area. DOFAW recommends the following relevant avoidance measures for the Hawaiian hawk:

- If a Hawaiian hawk is detected in the Study Area during active construction, cease all activities within 100 feet (30 m) of the bird(s), and do not approach the bird(s). Work may continue after the bird leaves the area of its own accord.

5.3.5 Hawaiian Hoary Bat

Direct impacts to bats could occur if roost trees are disturbed or through the use of barbed wire. Tetra Tech recommends the following avoidance measures provided by USFWS (2023b):

- To prevent entanglements, do not use barbed wire for fencing.
- Do not trim, disturb, or remove woody vegetation taller than 15 feet (4.6 m) between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

5.3.6 Sea Turtles and Marine Mammals

No sea turtles or marine mammals were detected within the Study Area during the surveys. However, green and hawksbill sea turtles have the potential to forage on the nearshore waters in the vicinity of the Study Area. Monk seals may also occasional haul out along the shoreline or occur in the nearshore waters. Tetra Tech recommends following the Standard Local Operating Procedures for Endangered Species in the Central and Western Pacific Region (Pac-SLOPES) provided by U.S. Army Corps of Engineers (USACE 2022) to minimize impacts to ESA-listed marine species (sea turtles, marine mammals, sharks, rays) and their habitats. Tetra Tech also recommends the following avoidance measures adapted from USFWS (2023b):

- Have a biologist (or qualified, trained individual) familiar with sea turtles and monk seals conduct a visual survey of the project site immediately prior to work to ensure no sea turtles or monk seals are present. If these species are found within the project area, cease all mechanical or construction activities within 100 feet (30 m) until the animal voluntarily leaves the area.
- Remove any project-related debris, trash, or equipment from the beach/shoreline area if not actively being used.
- Do not stockpile project-related materials in the intertidal zone, reef flats, and adjacent vegetated areas.
- Incorporate applicable USFWS best management practices regarding Work in Aquatic Environments (USFWS 2022).
- Avoid nighttime work during the nesting (May-September) and hatching season (November-December) of sea turtles.

- Minimize the use of lighting on or near beaches and shield all project-related lights so the light is not visible from the beach/shoreline.
- Incorporate design measures into the construction or operation of buildings adjacent to the beach/shoreline to reduce ambient outdoor lighting.

6.0 References

Ainley, D.G., T.C. Telfer, M.H. Reynolds, and A.F. Raine. 2020. Newell's Shearwater (*Puffinus newelli*), version 1.0. In Birds of the World (P.G. Rodewald, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.towshe2.01

Balazs, G.H., R.G. Forsyth, and A.K.H. Kam. 1987. Preliminary Assessment of Habitat Utilization by Hawaiian Green Turtles in their Resident Foraging Pastures. National Oceanic and Atmospheric Administration. NOAA Technical Memorandum Series NOAA-TM-NMFS-SWFC; 71. Accessed July 2024. https://repository.library.noaa.gov/view/noaa/5758.

Billerman, S. M., B. K. Keeney, P. G. Rodewald, and T. S. Schulenberg (Editors). 2022. Birds of the World. Cornell Laboratory of Ornithology, Ithaca, NY, USA. Accessed August 2024. https://birdsoftheworld.org/bow/home.

Banko, P.C., J.M. Black, and W.E. Banko. 2020. Hawaiian Goose (*Branta sandvicensis*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.hawgoo.01.

Bonaccorso, F.J., C.M. Todd, A.C. Miles, and P.M. Gorresen. 2015. Foraging Range Movements of the Endangered Hawaiian Hoary Bat, *Lasiurus cinereus semotus*. Journal of Mammalogy 96(1):64-71.

Carboneras, C., F. Jutglar, and G.M. Kirwan. 2021. European Storm-Petrel (*Hydrobates pelagicus*), version 1.1. In Birds of the World (Editor not available). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.bripet.01.1

Clarkson, K.E. and L.P. Laniawe. 2020. Hawaiian Hawk (*Buteo solitarius*), version 1.0. In Birds of the World (A.F. Poole and F.B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.hawhaw.01

CWRM (State of Hawai'i, Department of Land and Natural Resources: Commission on Water Resource Management). 2019. Water Resource Protection Plan. Prepared by Townscape, Inc. Accessed August 2024. https://files.hawaii.gov/dlnr/cwrm/planning/wrpp2019update/WRPP_ALL_201907.pdf.

CWRM. 2022. Surface water hydrologic unit boundaries for the 8 major Hawaiian Islands as of August 2022. Layer Name: Watersheds (CWRM). Accessed August 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::watersheds/explore?location=19.907608%2C-155.475058%2C8.18.

DAR (State of Hawai'i Division of Aquatic Resources). 2008. Streams (both perennial and non-perennial). Accessed August 2024. https://geoportal.hawaii.gov/datasets/HiStateGIS::streams/about.

DOFAW (State of Hawai'i, Department of Land and Natural Resources: Division of Forestry and Wildlife). 2015. Endangered Species Recovery Committee Hawaiian Hoary Bat Guidance Document.

eBird. 2021. eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York. Accessed September 2024. http://www.ebird.org.

Gaos, A.R., E.L. LaCasella, L. Kurpita, G. Balazs, S. Hargrove, C. King, H. Bernard, T.T Jones, and P.H. Dutton. 2020. Hawaiian hawksbills: a distinct and isolated nesting colony in the Central North Pacific Ocean revealed by mitochondrial DNA. Conservation Genetics 21: 771-783.

Gorresen, P.M., F.J. Bonaccorso, C. A. Pinzari, C.M. Todd, K. Montoya-Aiona, and K. Brinck. 2013. A five-year study of Hawaiian hoary bat (*Lasiurus cinereus semotus*) occupancy on the island of Hawai'i. Technical Report HCSU-041. Hawai'i Cooperative Studies Unit, University of Hawai'i at Hilo, Hilo, HI. July 2013.

Hess, S.C., C.R. Leopold, K. Misajon, D. Hu, and J.J. Jeffrey. 2012. Restoration of movement patterns of the Hawaiian Goose. The Wilson Journal of Ornithology 124(3): 478-486.

Jacobs, D.S. 1994. Distribution and abundance of the endangered Hawaiian hoary bat, *Lasiurus cinereus semotus*, on the island of Hawai'i. Pacific Science. 48(2): 193-200.

Jacobs, D.S. 1999. The diet of the insectivorous Hawaiian hoary bat (*Lasiurus cinereus semotus*) in an open and a cluttered habitat. Canadian Journal of Zoology. 77: 1603-1608. 10.1139/z99-110.Magnacca, K.N., and C. King. 2013. Assessing the presence and distribution of 23 Hawaiian yellow-faced bee species on lands adjacent to military installations on O'ahu and Hawai'i Island. Pacific Cooperative Studies Unit, University of Hawai'i at Mānoa. Technical Report 185.

Montoya-Aiona, K., P.M. Gorresen, K.N. Courtot, A. Aguirre, F. Calderon, S. Casler, S. Ciarrachi, J. Hoeh, J.L. Tupu, and T. Zinn. 2023. Multi-scale assessment of roost selection by 'ōpe'ape'a, the Hawaiian hoary bat (*Lasiurus semotus*). Plos one, 18(8): e0288280.

NMFS (National Marine Fisheries Service). 2007. Recovery plan for the Hawaiian monk seal (*Monachus schauinslandi*), Revision. https://repository.library.noaa.gov/view/noaa/3521.

NMFS. 2014. Revision of Critical Habitat for Hawaiian Monk Seals, Final Biological Report. Accessed October 2024. https://repository.library.noaa.gov/view/noaa/18684.

NOAA (National Oceanic and Atmospheric Administration). 2011. Endangered and Threatened Wildlife and Plants: Proposed Rulemaking to Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 76 (106): 32026 –32063.

NOAA. 2015. Endangered and Threatened Species: Final Rulemaking To Revise Critical Habitat for Hawaiian Monk Seals. Federal Register. 80 (162): 50926-50988.

NOAA. 2023a. Endangered and Threatened Wildlife and Plants: Proposed Rule To Designate Marine Critical Habitat for Six Distinct Population Segments of Green Sea Turtles. Federal Register. 88(137): 46572–46671.

NOAA. 2023b. National ESA Critical Habitat Mapper (v1.0) by the National Marine Fisheries Service. Accessed August 2024. https://www.fisheries.noaa.gov/resource/map/national-esa-critical-habitat-mapper.

NOAA. 2024. Species Directory of Hawksbill Turtle. Accessed July 2024. https://www.fisheries.noaa.gov/species/hawksbill-turtle.

NRCS (Natural Resources Conservation Service). 2024. Web Soil Survey. Accessed August 2024. http://websoilsurvey.nrcs.usda.gov/.

NWS (National Weather Service). 2024a. National Weather Service Honolulu, HI, Drought Information Statement for the Main Hawaiian Islands valid July 12, 2024. Accessed August 2024. https://www.weather.gov/hfo/DroughtInformationStatement.

NWS. 2024b. National Weather Service Honolulu, HI, Drought Information Statement for the Main Hawaiian Islands valid December 12, 2024. Accessed January 2025. https://www.weather.gov/hfo/DroughtInformationStatement.

NWS. 2025. Precipitation Summaries. Accessed January 2025. https://www.weather.gov/hfo/hydro_summary.

Nishida, G. 2002. Hawaiian Terrestrial Arthropod Checklist. 4th Edition. Hawaii Biological Survey Bishop Museum.

Pacific Birds Habitat Joint Venture (Pacific Birds). 2024. Strategic Plan for Hawai‘i Wetlands.

Price, J. P., Jacobi, J. D., Gon, S. M. III, Matsuwaki, D., Mehrhoff, L., Wagner, W., Lucas, M., and Rowe, B. 2012. Mapping plant species ranges in the Hawaiian Islands—Developing a methodology and associated GIS layers. U.S. Geological Survey Open-File Report 2012–1192, 34 p., one appendix (species table), 1,158 maps. http://pubs.usgs.gov/of/2012/1192/.

Reynolds, M.H., and G. Ritchotte. 1997. Evidence of Newell's Shearwater breeding in Puna District, Hawaii. Journal of Field Ornithology 68:26–32.

Rodríguez, A., N.D. Holmes, P.G. Ryan, K.-J. Wilson, L. Faulquier, Y. Murillo, A.F. Raine, J.F. Penniman, V. Neves, B. Rodríguez, J.J Negro, A. Chiaradia, P. Dann, T. Anderson, B. Metzger, M. Shirai, L. Deppe, J. Wheeler, P. Hodum, C. Gouveia, V. Carmo, G.P. Carreira, L. Delgado-Alburqueque, C. Guerra-Correa, F.-X. Couzi, M. Travers and M.L. Corre. 2017. Seabird mortality induced by land-based artificial lights. Conservation Biology, 31: 986-1001.

Simons, T.R. and C.N. Bailey. 2020. Hawaiian Petrel (*Pterodroma sandwichensis*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.hawpet1.01

Tomich, P.Q. 1986. Mammals in Hawaii. Bishop Museum Press, Honolulu, HI. 375 pp.

UH Hilo PACRC (University of Hawai'i Hilo, Pacific Aquaculture and Coastal Resource Center). 2001. UHH Pacific Aquaculture and Coastal Resource Center. Final Environmental Assessment.

USFWS (U.S. Fish and Wildlife Service). 1998. Recovery Plan for the Hawaiian hoary bat (*Lasiurus cinereus semotus*). U.S. Fish and Wildlife Service, Portland, OR.

USFWS. 2023a. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Green Sea Turtle. Federal Register. 88 (137): 46376- 46570.

USFWS. 2023b. Animal Avoidance and Minimization Measures. Accessed August 2024. https://www.fws.gov/sites/default/files/documents/Animal Avoidance and Minimization Measures - FINAL May 2023_0.pdf.

USFWS. 2024a. National Wetlands Inventory. Wetlands Data by State, Hawai'i. Accessed August 2024. https://www.fws.gov/node/264847.

USFWS. 2025. Critical Habitat - Polygon Features – Final. Accessed March 2025. https://www.arcgis.com/apps/mapviewer/index.html?url=https://services.arcgis.com/QVENGdaPbd4LUkLV/ArcGIS/rest/services/USFWS_Critical_Habitat/FeatureServer&source=sd.

USGS (U.S. Geological Survey). 2023. National Hydrography Dataset. Accessed August 2024. https://www.usgs.gov/national-hydrography/access-national-hydrography-products.

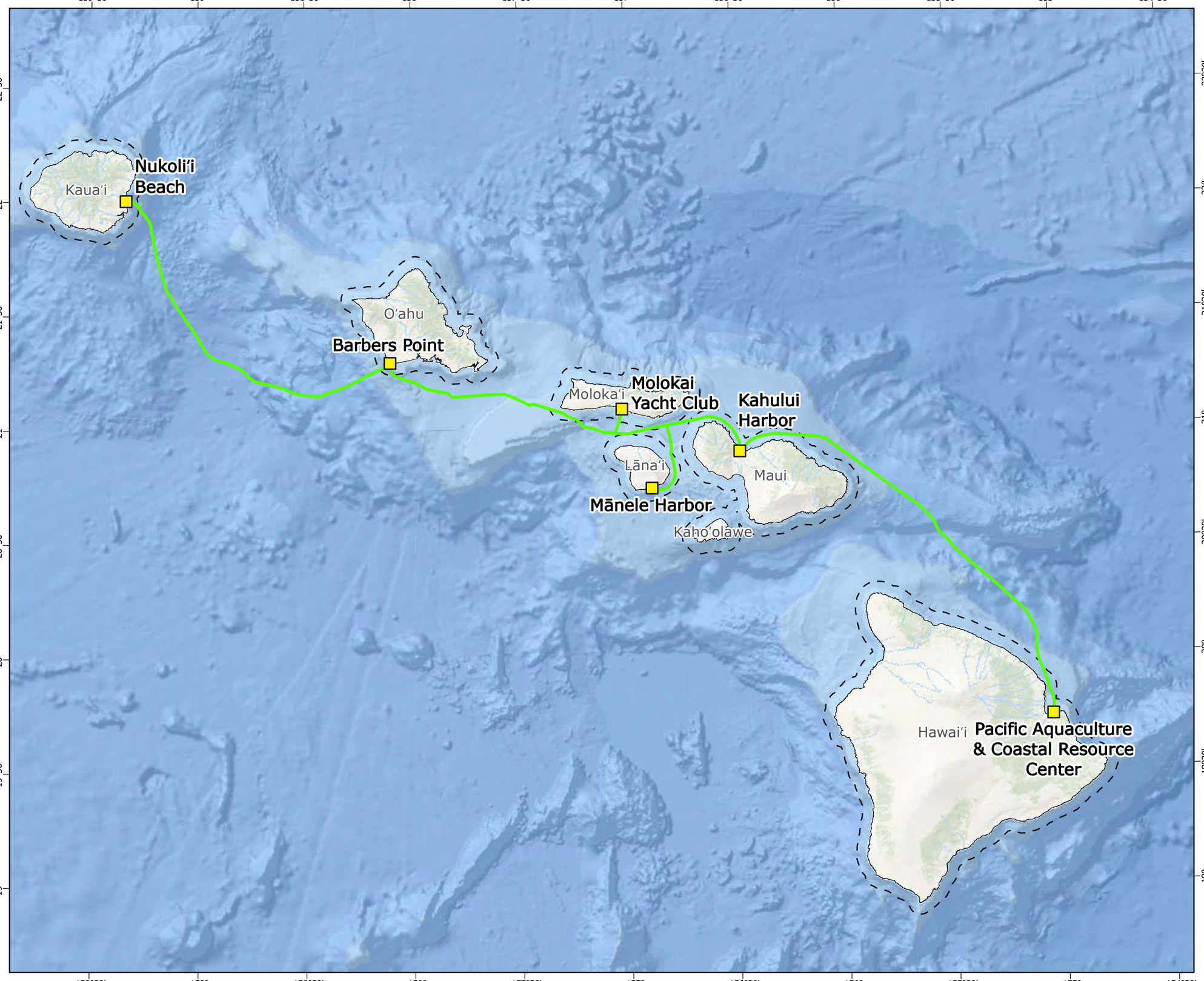
Wagner, W. L., D. R. Herbst, and D. H. Lorence. 2023. Flora of the Hawaiian Islands website. Accessed August 2024. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm.

WoRMS (World Register of Marine Species) Editorial Board. 2024. Accessed September 2024. https://www.marinespecies.org/aphia.php?p=search.

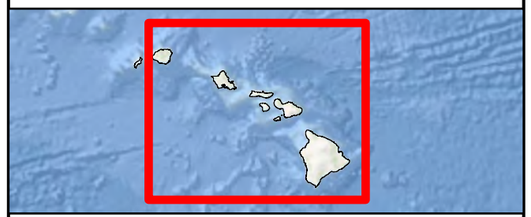
Figures

Hawaiian Islands Fiber Link

Figure 1
Project Overview



- Subsea Cable
- Cable Landing Site
- State Waters Limits (3 nautical miles)



0 20 40 80 120
Kilometers

0 10 20 40
Nautical Miles

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\ProjectOverview_20240514\ONI_HIFL_ProjectOverview_20240801.aprx

Hawaiian Islands Fiber Link Project - Hilo Cable Landing Site

Figure 2
Project Study Area and Vicinity



- Study Area
- Highway
- Roads

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System



0 0.25 0.5 0.75
Miles

0 1,000 2,000
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Hilo_20250815.aprx

-155°3'

(3)2-1-009:001

(3)2-1-011:005

(3)2-1-011:004

(3)2-1-011:010

Pacific Aquaculture and Coastal Resource Center

(3)2-1-009:041

Kalanianaole Street

-155°3'

Hawaiian Islands Fiber Link Project - Hilo Cable Landing Site

Figure 3A
Project Study Area: PACRC

Study Area

TMK Parcel

Roads

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.025 0.05

Miles

0 100 200

Feet

N

W E

S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Hilo_20250815\ONI_HIFL_BioReport_Hilo_20250815.aprx

-155°5'

W. Lanikaula Street

(3)2-4-001:167

University of Hawai'i at Hilo

-155°5'

Hawaiian Islands Fiber Link Project - Hilo Cable Landing Site

Figure 3B
Project Study Area: UH Hilo

Study Area

TMK Parcel

Roads

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.025 0.05

Miles

0 100 200

Feet

N

W E

S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Hilo_20250815\ONI_HIFL_BioReport_Hilo_20250815.aprx

-155°3'

-155°2'45"

Kalaniana'ole Street

-155°3'

-155°2'45"

Hawaiian Islands Fiber Link Project - Hilo Cable Landing Site

Figure 4A
Soils within the Study Area: PACRC

Study Area

Roads

NRCS Soil Symbol

Opihikao-Urban land complex, 2 to 20 percent slopes

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.025 0.05

Miles

0 100 200

Feet

N

W E

S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\cess706gisfs01\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Hilo_20250815\ONI_HIFL_BioReport_Hilo_20250815.aprx

-155°5'

W. Lanikaula Street

-155°5'

Hawaiian Islands Fiber Link Project - Hilo Cable Landing Site

Figure 4B
Soils within the Study Area: UH Hilo

Study Area

Roads

NRCS Soil Symbol

Keaukaha highly decomposed plant material, 2 to 10 percent slopes

Panaewa-Urban land complex, 2 to 10 percent slopes

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.025 0.05
Miles

0 100 200
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\MapsIBioReport_Hilo_20250815\ONI_HIFL_BioReport_Hilo_20250815.aprx

-155°3'

19°44'

Puhi Bay

Kalanianaʻole Street

Hawaiian Islands Fiber Link Project - Hilo Cable Landing Site

Figure 5A
Water Resources Mapped by NWI, NHD, and DAR: PACRC

Study Area

Roads

National Wetlands Inventory

Estuarine and Marine Deepwater

Estuarine and Marine Wetland

National Hydrography Dataset

Waterbody

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.05 0.1

Miles

0 250 500

Feet

N

W E

S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

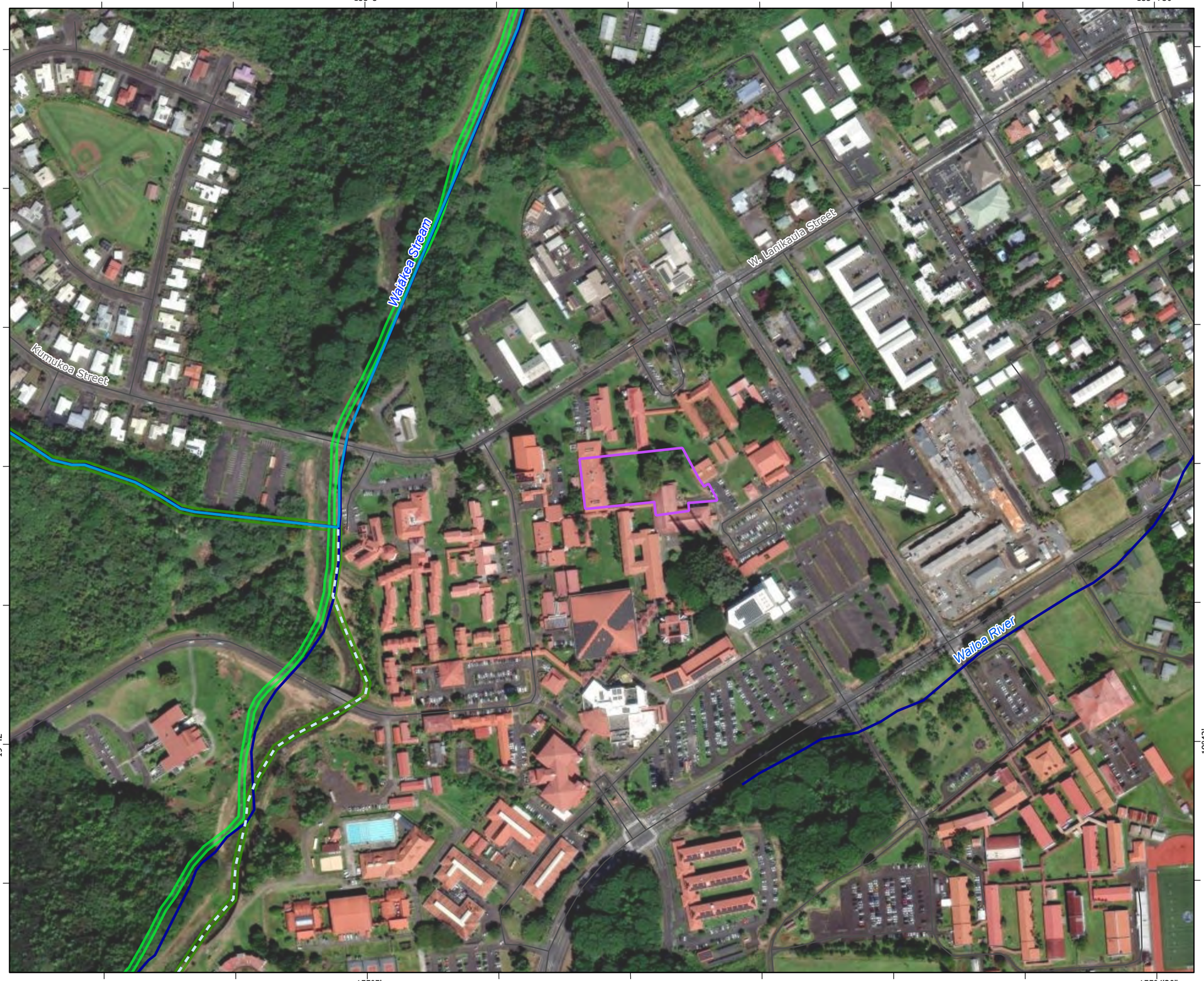
Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Hilo_20250815.aprx

-155°5'

-155°4'30"

19°42'



Hawaiian Islands Fiber Link Project - Hilo Cable Landing Site

Figure 5B
Water Resources Mapped by NWI, NHD, and DAR: UH Hilo

- Study Area
- Roads

National Wetlands Inventory

- Freshwater Emergent Wetland
- Riverine

National Hydrography Dataset

- Intermittent Stream
- Perennial Stream

Division of Aquatic Resources

- Stream

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.075 0.15
Miles

0 250 500
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Hilo_20250815.aprx

-155°2'55"

Kalanianaʻole Street

-155°2'55"

Hawaiian Islands Fiber Link Project - Hilo Cable Landing Site

Figure 6
Critical Habitat Within the Study Area and Vicinity

Study Area

Roads

Proposed Green Sea Turtle *(Chelonia mydas)* Critical Habitat

Marine

Monk Seal *(Neomonachus schauinslandi)* Critical Habitat

Marine

Terrestrial (extends from water's edge inland 16 feet [5 m] past shoreline)

Data displayed from publicly available datasets have varying spatial accuracy standards and use limitations as specified in the relevant dataset metadata.



0 0.02 0.04 0.06

Miles

0 50 100 200

Feet

N W E S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 08/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\BioReport_Hilo_20250815.aprx

Appendix A

Representative Photographs of the Study Area



Photo 1. Looking southeast from the northern boundary into the PACRC portion of the Study Area, depicting mowed grass and facility infrastructure, including aquaculture tanks. Lat/Long: 19.731857, -155.047984. (December 18, 2024)



Photo 2. Looking east into the PACRC portion of the Study Area, depicting Landscaped Areas with shrubs and trees along buildings and other facility infrastructure. Lat/Long: 19.730996, -155.048524. (December 18, 2024)



Photo 3. Looking southeast into PACRC portion of the Study Area, depicting mowed grass and utility infrastructure (foreground) and a stand of sugar cane (background). Lat/Long: 19.731228, -155.048539. (December 18, 2024)



Photo 4. Looking southeast along the northern boundary of the PACRC portion of the Study Area, depicting Coastal Strand vegetation along the rocky shoreline. Lat/Long: 19.731992, -155.04775. (December 18, 2024)



Photo 5. Looking north into the CLS portion of the Study Area on the UH Hilo campus depicting Landscaped Areas and campus infrastructure. Lat/Long: 19.702569, -155.079704. (June 26, 2024)



Photo 6. Looking north into the CLS portion of the Study Area on the UH Hilo campus, depicting Landscaped Areas with a section of unmowed grass and campus infrastructure. Lat/Long: 19.702342, -155.080016. (December 18, 2024)



Photo 7. Looking northwest into the western CLS portion of the Study Area on the UH Hilo campus, depicting Landscaped Areas and campus infrastructure. Lat/Long: 19.702433, -155.080344. (December 18, 2024)



Photo 8. Looking east into the western CLS portion of the Study Area on the UH Hilo campus, depicting Landscaped Areas and campus infrastructure. Lat/Long: 19.702648, -155.080767. (December 18, 2024)

APPENDIX H
ARCHAEOLOGICAL LITERATURE REVIEW AND FIELD INSPECTION REPORT

Pacific Legacy

Historic Preservation

CULTURAL RESOURCES CONSULTANTS

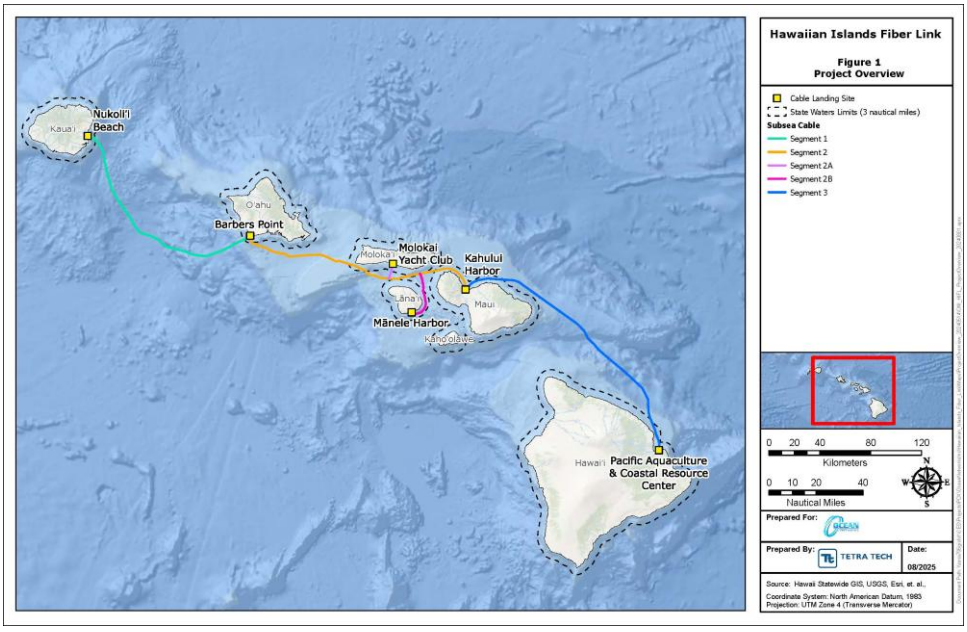
Hawai'i Office:
Kailua, O'ahu

California Offices:
Bay Area
Sierra/Central Valley
Business Office

DRAFT

LITERATURE REVIEW AND FIELD INSPECTION FOR THE PROPOSED HAWAIIAN ISLANDS FIBER LINK PROJECT WITH CABLE LANDING SITES ON KAUA'I, O'AHU, MAUI, MOLOKAI, LĀNA'I, AND HAWAI'I ISLANDS

[TMK: (1) 9-1-026:027; (1) 9-1-026:999 (OLA'I STREET ROW); (2) 3-7-001:021 (POR.); (2) 3-7-001:022 (POR.); (2) 3-7-001:999 (KAHULUI BEACH ROAD ROW); (2) 3-8-007:001 (POR.); (2) 3-8-007:040 (POR.); (2) 4-9-017:006 (POR.); (2) 4-9-017:027 (POR.); (2) 5-3-001:003 (POR.); (2) 5-3-001:011 (POR.); (2) 5-3-003:013 (POR.); (2) 5-3-003:014 (POR.); (2) 5-3-003:999 (ALANUI KAIMIKE STREET ROW); (3) 2-1-009:001 (POR.); (3) 2-1-009:041 (POR.); (3) 2-1-011:004 (POR.); (3) 2-1-011:005 (POR.); (3) 2-1-011:010 (POR.); (3) 2-4-001:167 (POR.); (4) 3-4-007:003 (POR.); (4) 3-7-003:007 (POR.); (4) 3-7-003:017 (POR.); AND (4) 3-7-003:999 (KŪHIŌ HIGHWAY ROW)]



Pacific Legacy: Exploring the past, informing the present, enriching the future.

This page intentionally left blank

DRAFT

LITERATURE REVIEW AND FIELD INSPECTION FOR THE PROPOSED HAWAIIAN ISLANDS FIBER LINK (HIFL) PROJECT WITH CABLE LANDING SITES ON KAUAʻI, OʻAHU, MAUI, MOLOKAI, LĀNAʻI, AND HAWAIʻI ISLANDS

[TMK: (1) 9-1-026:027; (1) 9-1-026:999 (OLAʻI STREET ROW); (2) 3-7-001:021 (POR.); (2) 3-7-001:022 (POR.);(2) 3-7-001:999 (KAHULUI BEACH ROAD ROW); (2) 3-8-007:001 (POR.); (2) 3-8-007:040 (POR.); (2) 4-9-017:006 (POR.); (2) 4-9-017:027 (POR.); (2) 5-3-001:003 (POR.); (2) 5-3-001:011 (POR.); (2) 5-3-003:013 (POR.), (2) 5-3-003:014 (POR.); (2) 5-3-003:999 (ALANUI KAIMIKE STREET ROW); (3) 2-1-009:001 (POR.); (3) 2-1-009:041 (POR.); (3) 2-1-011:004 (POR.); (3) 2-1-011:005 (POR.), (3) 2-1-011:010 (POR.); (3) 2-4-001:167 (POR.); (4) 3-4-007:003 (POR.); (4) 3-7-003:007 (POR.); (4) 3-7-003:017 (POR.); AND (4) 3-7-003:999 (KŪHIŌ HIGHWAY ROW)]

Prepared by:

Mara A. Mulrooney, Ph.D.,
Caleb C. Fechner, B.A.,
Ena M. Sroat, B.A.,
James D. McIntosh, B.A.,
Samara G.d. Albuquerque, B.A.,
Emmaline R. Irvine, M.A.,
Joseph L. Panuska, B.A.,
Daniel Mehert-Ab, B.A.,
and
Jillian A. Swift, Ph.D.

Pacific Legacy, Inc.
146 Hekili Street, Suite 205
Kailua, HI 96734
(808) 263-4800

Prepared for:

Tetra Tech
737 Bishop Street, Suite 2000
Honolulu, HI 96813

January 2026

TABLE OF CONTENTS

MANAGEMENT SUMMARY VIII

1.0 INTRODUCTION 1

1.1 Methods and Scope 1
1.2 Project Background and Location 2
1.2.1 Kauaʻi Cable Landing Site 4
1.2.2 Oʻahu Cable Landing Site 11
1.2.3 Maui Cable Landing Site 15
1.2.4 Molokai Cable Landing Site 19
1.2.5 Lānaʻi Cable Landing Site 23
1.2.6 Hawaiʻi Island Cable Landing Site 27

2.0 ARCHIVAL AND BACKGROUND RESEARCH 34

2.1 Kauaʻi Cable Landing Site 34
2.1.1 Archival Research Summary 34
2.1.2 Previous Archaeology 38
2.2 Oʻahu Cable Landing Site 49
2.2.1 Archival Research Summary 49
2.2.2 Previous Archaeology 52
2.3 Maui Cable Landing Site 57
2.3.1 Archival Research Summary 57
2.3.2 Previous Archaeology 61
2.4 Molokai Cable Landing Site 71
2.4.1 Archival Research Summary 71
2.4.2 Previous Archaeology 74
2.5 Lānaʻi Cable Landing Site 84
2.5.1 Archival Research Summary 84
2.5.2 Previous Archaeology 88
2.6 Hawaiʻi Cable Landing Site 98
2.6.1 Archival Research Summary 98
2.6.2 Previous Archaeology 102

3.0 RESULTS OF FIELD INSPECTION 113

3.1 Kauaʻi Cable Landing Site 114
3.2 Oʻahu Cable Landing Site 121
3.3 Maui Cable Landing Site 123
3.4 Molokai Cable Landing Site 126
3.5 Lānaʻi Cable Landing Site 133
3.6 Hawaiʻi Cable Landing Site 139

4.0 SUMMARY AND RECOMMENDATIONS 148

4.1 Kauaʻi Cable Landing Site 148
4.2 Oʻahu Cable Landing Site 148
4.3 Maui Cable Landing Site 149
4.4 Molokai Cable Landing Site 149
4.5 Lānaʻi Cable Landing Site 149
4.6 Hawaiʻi Island Cable Landing Site 150

4.7 Recommendations 150
5.0 REFERENCES CITED 151

LIST OF FIGURES

Figure 1. USGS Map showing the location of the proposed Hawaiian Islands Fiber Link Project Area (Map courtesy of Tetra Tech). 3
Figure 2. Location of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College on a USGS map. 6
Figure 3. Location of the Nukoliʻi Beach portion of the HIFL project area with TMK boundaries..... 7
Figure 4. Location of the Kauaʻi Community College portion of the HIFL project area with TMK boundaries. 8
Figure 5. Soil types within and around the Nukoliʻi Beach portion of the HIFL project area. 9
Figure 6. Soil types within and around the Kauaʻi Community College portion of the HIFL project area. 10
Figure 7. Location of the Oʻahu portion of the HIFL project area at Barbers Point Beach Park on a USGS map. 12
Figure 8. Location of the Oʻahu portion of the HIFL project area with TMK boundaries. 13
Figure 9. Soil types within and around the Oʻahu portion of the HIFL project area. 14
Figure 10. Location of the Maui portions of the HIFL project area at Kahului Harbor and UH Maui College on a USGS map. 16
Figure 11. Location of the Maui portions of the HIFL project area with TMK boundaries. 17
Figure 12. Soil types within and around the Maui portions of the HIFL project area. 18
Figure 13. Location of the Molokai portions of the HIFL project area at the Molokai Yacht Club and Molokai Education Center on a USGS map. 20
Figure 14. Location of the Molokai portions of the HIFL project area with TMK boundaries. 21
Figure 15. Soil types within and around the Molokai portions of the HIFL project area. 22
Figure 16. Location of the Lānaʻi portion of the HIFL project area at Mānele Harbor on a USGS map. 24
Figure 17. Location of the Lānaʻi portion of the HIFL project area with TMK boundaries. 25
Figure 18. Soil types within and around the Lānaʻi portion of the HIFL project area. 26
Figure 19. Location of the Hawaiʻi Island portions of the HIFL project area at PACRC and UH Hilo on a USGS map. 29
Figure 20. Location of the PACRC portion of the HIFL project area with TMK boundaries. 30
Figure 21. Location of the UH Hilo portion of the HIFL project area with TMK boundaries. 31
Figure 22. Soil types within and around the PACRC portion of the HIFL project area. 32
Figure 23. Soil types within and around the UH Hilo portion of the HIFL project area. 33
Figure 24. An 1878 Government Survey map showing the Lihue Plantation (red arrow) and Grove Farm (orange arrow) sugarcane fields in the area of present day Līhuʻe Town. Note the present day Kaumualiʻi Highway depicted here as an unimproved road. 36
Figure 25. A 1978 USGS orthophoto of southeastern Kauaʻi. Note the development in the vicinity of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College, as well as the urbanization of Līhuʻe Town. 37
Figure 26. Previous archaeological studies conducted within 0.5 miles of the Nukoliʻi Beach portion of the HIFL project area. 41

Figure 27. Previous archaeological studies conducted within 0.5 miles of the Kauaʻi Community College portion of the HIFL project area. 44
Figure 28. Previously identified historic properties within 0.5 miles of the Nukoliʻi Beach portion of the HIFL project area 46
Figure 29. Previously identified historic properties within 0.5 miles of the Kauaʻi Community College portion of the HIFL project area. 48
Figure 30. An 1825 map by Lieutenant C. Malden shows the Oʻahu portion of the HIFL project area located in the "uncultivated plain" of ʻEwa, with early post-Contact trails traversing the coastline and extending *mauka-makai*. 50
Figure 31. An 1899 map by T.D. Beardsley showing the Oʻahu portion of the HIFL project area located in the area labeled "Coral Plain" with the trails depicted in Figure 29 now indicated as developed roads. 51
Figure 32. Previous archaeological studies conducted within 0.5 miles of the Oʻahu portion of the HIFL project area. 54
Figure 33. Previously identified historic properties within 0.5 miles of the Oʻahu portion of the HIFL project area. 56
Figure 34. An 1893 map of the Spreckelsville Plantation. The "road across sand hills" runs through the northernmost portion of the Maui portions of the HIFL project area 59
Figure 35. An 1882 map by Monsarrat showing LCAs primarily located to the northwest of the Maui portions of the HIFL project area. A portion of the project area lies within LCA 420 (not shown), awarded to Kuihelani. 60
Figure 36. Previous archaeological studies conducted within 0.5 miles of the Maui portions of the HIFL project area. 65
Figure 37. Previously identified historic properties within 0.5 miles of the Maui portions of the HIFL project area. 70
Figure 38. An 1886 map showing the Molokai portions of the HIFL project area within Kaunakakai Ahupuaʻa, with the Molokai Yacht Club portion located in the vicinity of the Kamehameha V compound (red arrow) and the walled Kaunakakai Town (orange arrow). 72
Figure 39. A 1964 aerial photograph showing slight growth of Kaunakakai Town but more marked increased habitation on the *makai* side of Kamehameha V Highway. 73
Figure 40. Previous archaeological studies conducted within 0.5 miles of the Molokai portions of the HIFL project area. 80
Figure 41. Previously identified historic properties within 0.5 miles of the Molokai portions of the HIFL project area. 83
Figure 42. A 1927 map by F.E. Harvey showing the Lānaʻi portion of the HIFL project area within Pālāwai Ahupuaʻa, the locations of LCAs, and traditional place names in the vicinity of Mānele Harbor (see inset) 86
Figure 43. A 1941 photograph of the coastline around Mānele Harbor, titled "Puupehe, Lanai, T.H.," showing the largely unimproved landscape and the sand dunes connected Mānele Harbor (right) and Hulopoʻe Beach (left) (U.S. National Archives and Records Administration). 87
Figure 44. Previous archaeological studies within 0.5 miles of the Lānaʻi portion of the HIFL project area. 91
Figure 45. Previously identified historic properties within 0.5 miles of the Lānaʻi portion of the HIFL project area. 97
Figure 46. 1841 and 1856 map by Charles Wilkes showing Waiākea Harbor relative to the PACRC portion of the HIFL project area 100

Figure 47. A 1912 topographic map by Donn showing sugarcane related development, including Waiakea Mill, Hilo Sugar Co. Mill, and the Hilo Railroad which transported milled sugar to the harbor. 101
Figure 48. Previous archaeological studies conducted within 0.5 miles of the PACRC portion of the HIFL project area. 103
Figure 49. Previous archaeological studies conducted within 0.5 miles of the UH Hilo portion of the HIFL project area. 106
Figure 50. Previously identified historic properties within 0.5 miles of the PACRC portion of the HIFL project area. 108
Figure 51. Previously identified historic properties within 0.5 miles of the UH Hilo portion of the HIFL project area. 112
Figure 52. Spatial distribution of potential historic properties that were identified during the field inspection of the Nukoli‘i Beach portion of the HIFL project area. 115
Figure 53. T-001, a concrete jetty with close-up of cylindrical structure in the Nukoli‘i Beach portion of the HIFL project area (view to northwest). 116
Figure 54. Overview showing T-001, a concrete jetty on the shoreline in the Nukoli‘i Beach portion of the HIFL project area (view to northeast) 116
Figure 55. Overview of T-001, showing additional cylindrical structures which extend further offshore in the Nukoli‘i Beach portion of the HIFL project area (view to northwest). 117
Figure 56. Close-up of T-002, metal grate with drainage ditch in the Nukoli‘i Beach portion of the HIFL project area (view to northwest). 117
Figure 57. Overview of SIHP 50-30-08-02235 ditch taken from Kaua‘i Beach Drive in the Nukoli‘i Beach portion of the HIFL project area (view to northwest). 118
Figure 58. Overview of SIHP 50-30-08-02235 ditch taken from Kaua‘i Beach Drive in the Nukoli‘i Beach portion of the HIFL project area (view to southeast) 118
Figure 59. Overview taken from shoreline, showing Nukoli‘i Beach Park and associated facilities within the Nukoli‘i Beach portion of the HIFL project area (view to west). 119
Figure 60. Overview of Nukoli‘i Beach Park taken from the northwest corner of the Nukoli‘i Beach portion of the HIFL project area (view to southeast). 119
Figure 61. Overview showing Kaua‘i Beach Drive within the Nukoli‘i Beach portion of the HIFL project area (view to east). 120
Figure 62. Overview taken from the east corner of the Kaua‘i Community College portion of the HIFL project area, showing the S.W. Wilcox II Learning Resource Center with a *milo* tree in foreground (view to west). 120
Figure 63. Overview showing the Natural Science Building from the south corner of the Kaua‘i Community College portion of the HIFL project area (view to north). 121
Figure 64. Overview of northern portion of the O‘ahu portion of the HIFL project area at Barbers Point Beach Park showing cul-de-sac and utility poles (view to northwest). 122
Figure 65. Overview of the southern part of the O‘ahu portion of the HIFL project area at Barbers Point Beach Park (view to southeast). 122
Figure 66. Overview of eastern part of the O‘ahu portion of the HIFL project area at Barbers Point Beach Park with Campbell Industrial Park in the background (view to northeast) 123
Figure 67. Overview of the northernmost part of the Kahului Harbor portion of the HIFL project area at the shoreline (view to west). 124
Figure 68. Overview of the portion of the HIFL project area at Kahului Harbor looking towards Kahului Harbor (view to northeast). 124
Figure 69. Overview of the UH Maui College portion of the HIFL project area showing the campus entrance on Wahinepio Ave. (view to north). 125

Figure 70. Overview of southwest corner of the portion of the HIFL project area at UH Maui College showing the ʻIke Leʻa Building (view to northeast). 125
Figure 71. Spatial distribution of potential historic property that was identified during the field inspection of the HIFL project area at the Molokai Yacht Club. 127
Figure 72. Potential historic property, T-003, a debris pile identified within the HIFL project area at the Molokai Yacht Club (view to west). 128
Figure 73. Overview showing T-003 debris pile located on the right side of a line of shipping containers within the HIFL project area at the Molokai Yacht Club (view to southwest). 128
Figure 74. Overview of northern portion of the HIFL project area at the Molokai Yacht Club, showing T-003 on the eastern side (view to northeast). 129
Figure 75. Overview of the open area behind the Molokai Yacht Club Building in the recorded location of the subsurface deposit SIHP 50-60-03-00630 within the HIFL project area at the Molokai Yacht Club (view to northeast). 129
Figure 76. Overview of containers on the west side of Molokai Yacht Club building, in the vicinity of the previously recorded location of SIHP 50-60-03-02573 within the HIFL project area at the Molokai Yacht Club (view to east). 130
Figure 77. Overview of the southern portion of the HIFL project area at the Molokai Yacht Club showing the Molokai Yacht Club building (view to north). 130
Figure 78. Overview of shoreline in the southernmost portion of the HIFL project area at the Molokai Yacht Club (view to east). 131
Figure 79. Overview of the southwest portion of the HIFL project area at the Molokai Yacht Club (view to west). 131
Figure 80. Overview of the portion of the Molokai HIFL project area at the Molokai Education Center taken from Alanui Kaimike Street (view to southwest). 132
Figure 81. Overview of the west side of the portion of the HIFL project area at the Molokai Education Center campus (view to south). 132
Figure 82. Overview of the landscaped park area at the Mānele Small Boat Harbor with a grill and bar under a mature Ficus tree (view to southeast). 133
Figure 83. Spatial distribution of potential historic properties that were identified during the field inspection of the Lānaʻi portion of the HIFL project area at Mānele Harbor. 134
Figure 84. T-004, a concrete ditch identified within the Lānaʻi portion of the HIFL project area (view to east). 135
Figure 85. Plan view T-004, a concrete ditch identified within the Lānaʻi portion of the HIFL project area; outer edges of ditch are amorphous and informal, incorporating cobbles and boulders (view to southwest). 135
Figure 86. T-005, a stone wall identified within the Lānaʻi portion of the HIFL project area, running along top of small bluff (view to east). 136
Figure 87. North end of T-005 wall identified within the Lānaʻi portion of the HIFL project area (view to southwest). 136
Figure 88. T-005, wall identified within the Lānaʻi portion of the HIFL project area, showing the north end that is possibly located within project area (view to northwest). 137
Figure 89. Central and northern portion of T-005, a wall identified within the Lānaʻi portion of the HIFL project area, showing construction style (view to southwest). 137
Figure 90. Overview of a portion of the park area around the harbor, showing the comfort stations (view to southwest). 138
Figure 91. Overview of the west edge of the *kiawe* growth along the road leading to the beach (view to southwest). 138

Figure 92. Spatial distribution of potential historic properties and a modern platform that were identified during the field inspection of the PACRC portion of the HIFL project area. 140
Figure 93. Spatial distribution of potential historic properties that were identified during the field inspection of the UH Hilo portion of the HIFL project area. 141
Figure 94. Overview showing the T-006 large concrete circular tank at the PACRC facility (view to north). 142
Figure 95. T-006, rectangular concrete and metal tank adjacent to large circular tank in the HIFL project area at PACRC (view to southwest). 142
Figure 96. T-007, rectangular concrete tank in the portion of the HIFL project area at PACRC (view to southeast). 143
Figure 97. T-008, metal and concrete components of possible sewage treatment facility infrastructure in the portion of the HIFL project area at PACRC (view to northwest). 143
Figure 98. T-009, concrete culvert in the portion of the HIFL project area at UH Hilo (view to south). 144
Figure 99. Modern low stone rectangular platform identified within the portion of the HIFL project area at UH Hilo (view to west). 144
Figure 100. Overview of the PACRC facility from the southwest corner of the portion of the HIFL project area at PACRC (view to north). 145
Figure 101. Overview of the central portion of the HIFL project area at PACRC (view to north). 145
Figure 102. Overview of the shoreline portion of the HIFL project area at PACRC (view to west). 146
Figure 103. Overview of the portion of the HIFL project area at UH Hilo (view to north). 146
Figure 104. Overview showing the east side of Business Ed and Tech Building (T-011) with utilities area in foreground (behind walkway) and parking lot to left, within the portion of the HIFL project area at UH Hilo (view to north). 147

LIST OF TABLES

Table 1. Previous Archaeological Studies Within 0.5 Miles of the Nukoliʻi Beach Portion of the HIFL Project Area 40
Table 2. Previous Archaeological Studies Within 0.5 Miles of the Kauaʻi Community College Portion of the HIFL Project Area 42
Table 3. Previously Identified Historic Properties Within 0.5 Miles of the Nukoliʻi Beach Portion of the HIFL Project Area 45
Table 4. Previously Identified Historic Properties Within 0.5 Miles of the Kauaʻi Community College Portion of the HIFL Project Area 47
Table 5. Previous Archaeological Studies within 0.5 Miles of the Oʻahu Portion of the HIFL Project Area 52
Table 6. Previously Identified Historic Properties Within 0.5 Miles of the Oʻahu Portion of the HIFL Project Area 55
Table 7. Previous Archaeological Studies Within 0.5 Miles of the Maui Portions of the HIFL Project Area 61
Table 8. Previously Identified Historic Properties Within 0.5 Miles of the Maui Portions of the HIFL Project Area 66
Table 9. Previously Identified Historic Properties Within 0.5 Miles of the Molokai Portions of the HIFL Project Areas 81
Table 10. Previous Archaeological Studies within 0.5 Miles of the Lānaʻi Portion of the HIFL Project Area 88

Table 11. Previously Identified Historic Properties Within 0.5 Miles of the Lānaʻi Portion of the HIFL Project Area 92
Table 12. Previous Archaeological Studies Within 0.5 Miles of the PACRC Portion of the HIFL Project Area 102
Table 13. Previous Archaeological Studies Within 0.5 Miles of the UH Hilo Portion of the HIFL Project Area 104
Table 14. Previously Identified Historic Properties Within 0.5 Miles of the PACRC Portion of the HIFL Project Area 107
Table 15. Previously Identified Historic Properties Within 0.5 Miles of the UH Hilo Portion of the HIFL Project Area 109
Table 16. Potential Historic Properties Identified through the Literature Review and Field Inspection for the HIFL Project 113
Table 17. Potential Historic Properties Identified during the Field Inspection of the Kauaʻi Portion of the HIFL Project Area at Nukoliʻi Beach 114
Table 18. Potential Historic Property Identified during the Field Inspection of the Molokai Portion of the HIFL Project Area at Molokai Yacht Club 126
Table 19. Potential Historic Properties Identified during the Field Inspection of the Lānaʻi Portion of the HIFL Project Area 133
Table 20. Potential Historic Properties Identified during the Field Inspection of the Hawaiʻi Island Portions of the HIFL Project Area at PACRC and UH Hilo 139

Note: *In this report, the spellings and the use of diacritical marks (glottal stops and macrons) follow conventions issued by Pukui and Elbert (1986) and Pukui et al. (1974) with limited exceptions – spellings and diacritical marks are used as the original sources used them in quotations, titles, and proprietary names.*

Cover Image: *Locations of the HIFL undersea cable routes and terrestrial cable landing sites, image courtesy of ONI.*

MANAGEMENT SUMMARY

Reference	Literature Review and Field Inspection for the Proposed Hawaiian Islands Fiber Link (HIFL) Project, with Cable Landing Sites on Kauaʻi, Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Islands (Mulrooney et al. 2026)
Date	January 2026 (Draft)
Project Number(s)	Pacific Legacy, Inc. Job Code 4060.02 HICRIS Project No. 2025PR00468
Project Location	The HIFL Project will include a subsea cable that would be surface laid on the seabed within State and U.S. Federal waters to connect the six main Hawaiian Islands; the six cable landing sites would include the following locations: • Kauaʻi Cable Landing Site: Hanamāʻulu and Niumalu Ahupuaʻa, Puna Moku (Modern District of Līhuʻe), [TMKs: (4) 3-4-007:003 (por.), (4) 3-7-003:007 (por.), (4) 3-7-003:017 (por.), and (4) 3-7-003:999 (Kūhiō Highway ROW)] • Oʻahu Cable Landing Site: Honouliuli Ahupuaʻa, ʻEwa District, [TMK: (1) 9-1-026:027, (1) 9-1-026:999 (Olaʻi Street ROW)] • Maui Cable Landing Site: Wailuku Ahupuaʻa, Wailuku District, [TMKs: (2) 3-7-001:021 (por.), (2) 3-7-001:022 (por.), (2) 3-7-001:999 (Kahului Beach Road ROW), (2) 3-8-007:001 (por.), (2) 3-8-007:040 (por.)] • Molokai Cable Landing Site: Kaunakakai Ahupuaʻa, Kona Moku (Modern District of Molokai), [TMKs: (2) 5-3-001:003 (por.); (2) 5-3-001:011 (por.); (2) 5-3-003:013 (por.), (2) 5-3-003:014 (por.), (2) 5-3-003:999 (Alanui Kaimike Street ROW)] • Lānaʻi Cable Landing Site: Pālāwai Ahupuaʻa, Lāhaina District, [TMKs: (2) 4-9-017:006 (por.), (2) 4-9-017:027 (por.)] • Hawaiʻi Island Cable Landing Site: Waiākea Ahupuaʻa, South Hilo District, [TMKs: (3) 2-1-009:001 (por.), (3) 2-1-009:041 (por.), (3) 2-1-011:004 (por.), (3) 2-1-011:005 (por.), (3) 2-1-011:010 (por.), (3) 2-4-001:167 (por.)].
Project Description and Related Ground Disturbance	The HIFL Project involves construction, operation, and maintenance of an interisland subsea cable with cable landing sites located on Kauaʻi, Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Island. The subsea cable, which would have a maximum diameter of 1.1 inches, would be surface-laid on the seabed within State and U.S. Federal waters to interconnect the islands. At all six cable landing sites, horizontal directional drilling (HDD) would be used to install underground conduit to facilitate installation of the cable beneath the shoreline between the onshore facilities and an offshore punchout location in nearshore waters. Facilities on each island would include a beach manhole (BMH) within the cable landfall area, terrestrial fiber optic cable, and a cable landing station (CLS) with associated cable termination and monitoring equipment.
Project Area Land Jurisdiction	County of Kauaʻi, City and County of Honolulu, County of Maui, County of Hawaiʻi, State of Hawaiʻi, Garden Isle Dream LLC, Kauai Beach Resort Association, Knickerbocker Life Insurance Company, Walter T. Shimoda, Nancy Shimoda, Department of Hawaiian Home Lands
Project Proponent	University of Hawaiʻi and Ocean Networks Inc. (public-private partnership)
Investigation Permit Number	Fieldwork for this project was performed under Pacific Legacy's Hawaiʻi State Historic Preservation Division (SHPD) annual archaeological permit, issued per Hawaiʻi Administrative Rules (HAR) §13-282. Pacific Legacy's permit for the year 2025 is 25-11.
Agencies	U.S. Army Corps of Engineers (USACE), State of Hawaiʻi Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL), County of Kauaʻi, City and County of Honolulu, Maui County, County of Hawaiʻi
Project Area Acreage	32.92 acres (spanning all six cable landing sites)

Document Purpose and Historic Preservation Regulatory Context	This study was designed to investigate previous land use of the proposed project area and determine whether historic properties exist in the proposed project area. It is also intended to facilitate project planning and support the project's historic preservation review process under Hawai'i Revised Statutes (HRS) Chapter 6E and Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.
Fieldwork Effort	Fieldwork was conducted over six non-consecutive days, with a single-day field inspection conducted by two archaeologists for each island: February 6, 2025 (Kaua'i), February 12, 2025 (Hawai'i Island), February 20, 2025 (Lāna'i), March 5, 2025 (Molokai), March 6, 2025 (O'ahu), and March 13, 2025 (Maui). Fieldwork was conducted by Pacific Legacy archaeologists Jillian Swift, Ph.D., Ena Sroat, B.A., Daniel Mehert-Ab, B.A., and Samara Albuquerque, B.A. The field inspections consisted of a reconnaissance pedestrian survey and photo documentation of the proposed project area. All fieldwork was conducted under the general supervision of Mara Mulrooney, Ph.D. (principal investigator).
Results Summary	The field inspection documented one previously identified historic property within the cable landfall area on Kaua'i as well as 11 other additional potential historic property features within the project area, as follows: • Kaua'i: post-Contact ditch (SIHP 50-30-08-02235), concrete jetty (T-001) and metal drainage gate and small drainage ditch (T-002) in the cable landfall area at Nukoli'i Beach • Molokai: very late post-Contact and/or recent debris pile (T-003) in the cable landfall area at Molokai Yacht Club • Lāna'i: concrete ditch segment (T-004) and post-Contact retaining wall (T-005) in the cable landfall area at Mānele Small Boat Harbor • Hawai'i Island: circular and rectangular concrete tanks (T-006 and T-007) and metal rebar and concrete pipe infrastructure (T-008) in the cable landfall area at PACRC; concrete culvert (T-009), as well as the Wentworth Building (T-010), and the Business Education and Technology Building (T-011) at UH Hilo, where the CLS will be installed. Two subsurface historic properties that were previously identified within the Molokai Yacht Club portion of the project area were not identified during the field inspection. No potential historic properties were identified in the O'ahu or Maui portions of the HIFL project area.
Recommendations	An architectural survey of any historic buildings or structures that may be impacted by the project and an archaeological inventory survey with subsurface testing are recommended to fully identify and document all potential historic properties and provide significance assessments and recommendations in accordance with HRS Chapter 6E and Section 106 of the NHPA.

1.0 INTRODUCTION

Pacific Legacy, Inc., under contract to Tetra Tech, conducted a literature review and field inspection (LRFI) for the proposed Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system with cable landing sites located on Kauaʻi, Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Islands (Figure 1). The cable landing sites are located in the following areas: Kauaʻi: Hanamāʻulu and Niumalu Ahupuaʻa, Puna Moku (Modern District of Līhuʻe), [TMKs: (4) 3-4-007:003 (por.), (4) 3-7-003:007 (por.), (4) 3-7-003:017 (por.), and (4) 3-7-003:999 (Kūhiō Highway ROW)]; Oʻahu: Honouliuli Ahupuaʻa, ʻEwa District [TMK: (1) 9-1-026:027, (1) 9-1-026:999 (Olaʻi Street ROW)]; Maui: Wailuku Ahupuaʻa, Wailuku District [TMKs: (2) 3-7-001:021 (por.), (2) 3-7-001:022 (por.), (2) 3-7-001:999 (Kahului Beach Road ROW) (2) 3-8-007:001 (por.), (2) 3-8-007:040 (por.)]; Molokai: Kaunakakai Ahupuaʻa, Kona Moku (Modern District of Molokai) [TMKs: (2) 5-3-001:003 (por.); (2) 5-3-001:011 (por.); (2) 5-3-003:013 (por.), (2) 5-3-003:014 (por.), (2) 5-3-003:999 (Alanui Kaimike Street ROW)]; Lānaʻi: Pālāwai Ahupuaʻa, Lāhaina District [TMKs: (2) 4-9-017:006 (por.), (2) 4-9-017:027 (por.)]; and Hawaiʻi Island: Waiākea Ahupuaʻa, South Hilo District [TMKs: (3) 2-1-009:001 (por.), (3) 2-1-009:041 (por.), (3) 2-1-011:004 (por.), (3) 2-1-011:005 (por.), (3) 2-1-011:010 (por.), (3) 2-4-001:167 (por.)].

The purpose of this LRFI was to investigate previous land use of the surrounding area and to determine whether historic properties exist in the proposed project area. The work was also designed to facilitate historic preservation review by the State Historic Preservation Division (SHPD) under Hawaiʻi Revised Statutes (HRS) Chapter 6E and Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended.

1.1 METHODS AND SCOPE

The background research conducted for this LRFI involved a thorough document review. Research involved a review of historical documents, historical maps and aerial photographs, and reference materials. Relevant archaeological reports were obtained from the SHPD Library and Pacific Legacy's internal database. Historical maps were obtained from the Hawaiʻi State Department of Accounting and General Services (DAGS) and Pacific Legacy's internal database of relevant historical and ethnographic sources housed in the Pacific Legacy library and found through online databases including the Hawaiian Legends Index housed at the University of Hawaiʻi at Mānoa (https://manoa.hawaii.edu/hawaiiancollection/legends/), the Office of Hawaiian Affairs (OHA) Papakilo (https://www.papakilodatabase.com/) and Kīpuka (https://kipukadatabase.com/) Databases, and the Hawaiian Electronic Library, Ulukau (https://ulukau.org/index.php?l=en), and the Digital Archives of Hawaiʻi (https://digitalarchives.hawaii.gov/). Information on Land Commission Awards (LCAs) was obtained from Waihona ʻĀina (https://waihona.com/) and accessed through the Ulukau Māhele Database (https://ulukau.org/cgi-bin/vicki?a=p&p=intro). These resources, as well as GIS mapping, were used to identify the locations of previous archaeological surveys and synthesize the background sections of this report.

In addition to background research, Pacific Legacy, Inc. conducted a field inspection of the project area over the course of six non-consecutive days on February 6, 2025 (Kauaʻi), February 12 (Hawaiʻi Island), February 20 (Lānaʻi), March 5, 2025 (Molokai), March 6, 2025 (Oʻahu), and March 13 (Maui). The field inspection was conducted by Pacific Legacy archaeologists Jillian Swift, Ph.D., Ena Sroat, B.A., Daniel Mehert-Ab, B.A., and Samara Albuquerque, B.A. under the overall supervision

of Mara Mulrooney, Ph.D. (principal investigator). The field inspection consisted of a reconnaissance pedestrian survey and photo documentation of the proposed project area. The project area did not include the segments of fiber that will be installed on the existing utility system because they comprise existing third-party infrastructure.

1.2 PROJECT BACKGROUND AND LOCATION

In recent years, high-speed internet (broadband) has emerged as critical infrastructure for functions including business and economic development, educational advancement, health care, social and civic engagement, governmental and public services, and national security. Fiber optic cable systems, which utilize lasers to transmit data signals through protected fiber optic strands, provide much higher total bandwidth than other technologies, and are currently the most robust and feasible method for high-speed transmission and distribution of broadband. In Hawai'i, most of the broadband connectivity to and between the islands is provided via submarine fiber optic cable systems. However, there has been a lack of investment in this infrastructure, resulting in limited and aging assets which provide the critical link between the global internet and Hawai'i's residents. In addition to approaching retirement age, the existing systems also no longer meet the current and future bandwidth demands associated with digital streaming and cloud technology.

The purpose of the HIFL Project is to develop an interisland fiber optic cable system with diverse and strategically located cable landing sites to provide the infrastructure needed for robust and reliable broadband across the State of Hawai'i. Specifically, it involves construction, operation, and maintenance of a subsea fiber optic cable system that would distribute broadband to the six main Hawaiian Islands, with associated cable landing sites on Kaua'i, O'ahu, Maui, Lāna'i, Molokai and Hawai'i Island. The project would address a key component of the state's *Connect Kākou* broadband initiative, a statewide plan for infrastructural investments to ensure that all of Hawai'i's residents have access to robust and reliable broadband service.

The HIFL Project would include both marine and terrestrial components, with the marine component comprising approximately 416 miles of submarine fiber optic cable surface-laid on the seabed between the islands. The cable would have a maximum diameter of approximately 1.1 inches, with the deepest cables having a diameter about the width of a typical household garden hose (0.6 inches). The cable would be installed in five distinct segments spanning the nearshore state waters and surrounding U.S. federal waters, as needed to connect the six cable landing sites (see Figure 1). At all six cable landing sites, horizontal directional drilling (HDD) would be used to install underground conduit between the onshore area for each cable landfall and an associated offshore punchout location in the nearshore waters, thus allowing the subsea cable to make landfall while traversing beneath and avoiding impacts to the shoreline. The terrestrial components at each cable landing site would include a beach manhole (BMH), terrestrial fiber optic cable (terrestrial cable), and a cable landing station (CLS). The BMH would be an underground reinforced concrete vault where the subsea cable would terminate and connect with the terrestrial cable. The terrestrial cable would extend from the BMH toward the CLS via underground conduit. In addition to the terrestrial cable, the Project would also utilize fiber on each island's existing utility system to reach the CLS. To the extent practicable, each CLS would be located on UH property, consisting of either space within an existing building or a new modular structure. The CLS would house the equipment needed to support subsea cable transmission and monitoring, as well as facilitate interconnection with the local telecommunications network.

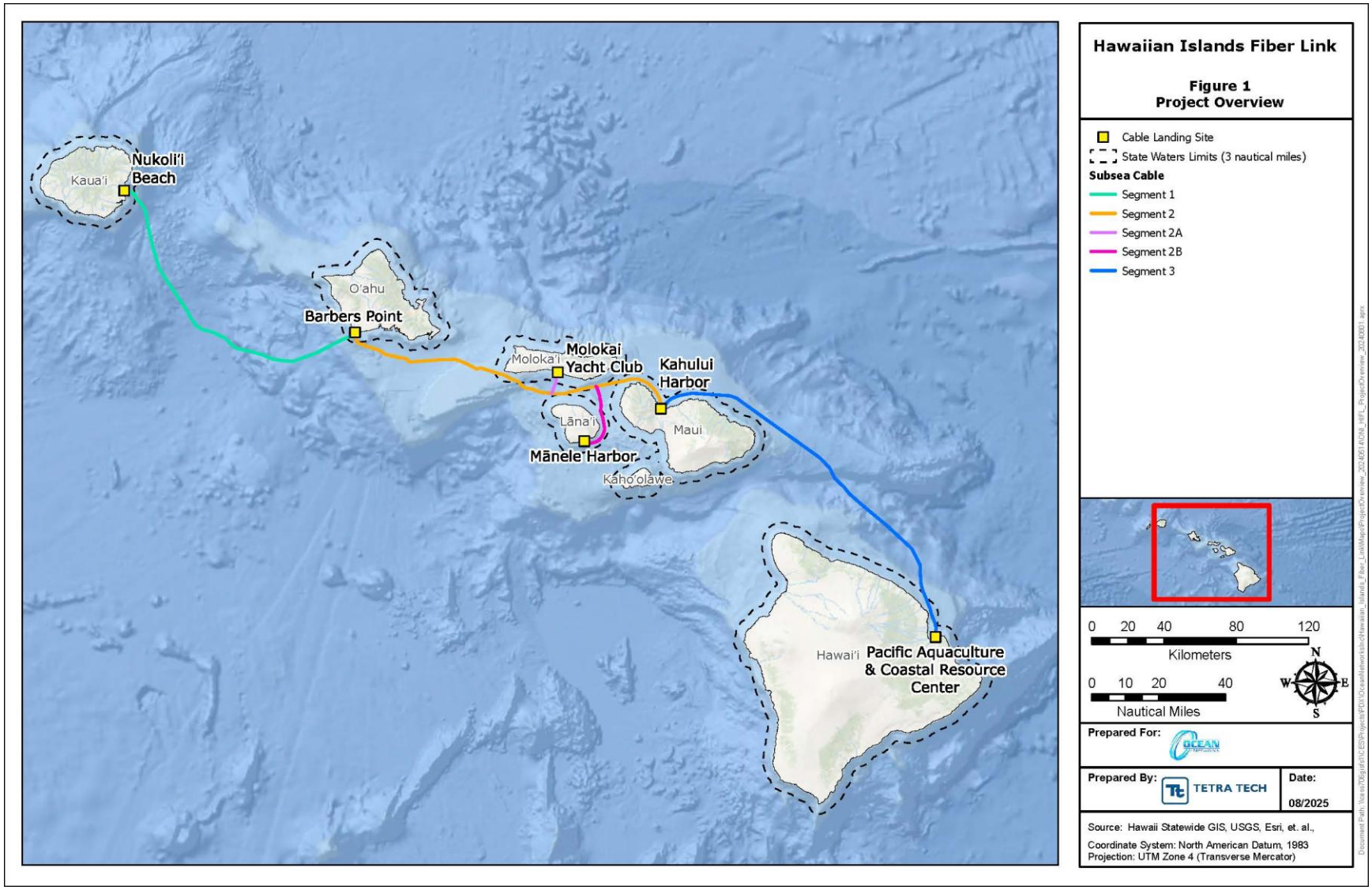


Figure 1. USGS Map showing the location of the proposed Hawaiian Islands Fiber Link Project Area (Map courtesy of Tetra Tech).

1.2.1 Kauaʻi Cable Landing Site

The proposed cable landfall on the island of Kauaʻi is located at Nukoliʻi Beach, an undeveloped beach park accessed via Kauaʻi Beach Road from Kūhiō Highway, just north of Hanamāʻulu, in Hanamāʻulu Ahupuaʻa in the modern district of Līhuʻe (Figure 2, Figure 3). The landfall would include a single HDD conduit, extending approximately 4,551 ft (1,387 m) from a BMH to the nearshore waters punchout point at a water depth of approximately 78 ft (24 m). The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be sited in an undeveloped portion of the beach park near the existing bathroom facilities. From the BMH, the terrestrial cable would be installed in new underground conduit along Kauaʻi Beach Road and Kauaʻi Beach Drive, terminating at a manhole at the intersection with Kūhiō Highway. From the BMH, the terrestrial cable would be installed in a combination of new underground conduit and third-party underground conduit along Kauaʻi Beach Road and Kauaʻi Beach Drive, terminating at a manhole near the intersection with Kūhiō Highway. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, generally following a route along Kūhiō Highway and Kaumualiʻi Highway to Kauaʻi Community College, in Niumalu Ahupuaʻa (Figure 4). Space within an existing building on the Kauaʻi Community College campus would be used as the CLS for this cable landing. A new generator would be located adjacent to the existing building to provide emergency power; approximately 20 ft (6 m) of trenching would be required for underground conduit to run power between the generator and the CLS.

Līhuʻe lies on the windward side of the island of Kauaʻi. Līhuʻe receives less rainfall than areas of Kauaʻi located at higher elevation. Līhue receives a mean annual precipitation of 37.05 inches (94.107 cm). The mean monthly rainfall varies between 1.61 inches (4.09 cm) in June and 4.61 inches (11.71 cm) in March, with most rainfall occurring during the winter months. The annual high temperature in Līhuʻe is 81˚F and the annual low is 70˚F (Longman et al. 2024).

The soils within the portion of the project area at Nukoliʻi Beach consist of beach sand (BS) at the shoreline, as well as Mokuleia fine sandy loam (Mr) and fill land (Fd). The underground portions of the cable also traverse through poorly drained Mokuleia clay loam (Mta), Lihue silty clay (LhE2), and the Lihue gravelly silty clay series (LIC, LIB) (Figure 5).

Soils within the Kauaʻi Community College portion of the project area are largely within the Puhi silty clay loam series, characteristic of broad interfluves in the uplands of Kauaʻi (Foote et al. 1972). Here, soils consist entirely of Puhi silty clay loam, 0 to 3 percent slopes (PnA). These soils are well-drained and level, with moderately rapid permeability and slow runoff. They are typically used for agriculture, pasturage, and home sites (Foote et al. 1972:115) (Figure 6).

Vegetation within the project area at Nukoliʻi Beach includes maintained beach park vegetation, a coastal strand, and landscaped areas. There is an extensive manicured lawn of St. Augustine grass (*Stenotaphrum secundatum*) and Bermuda grass (*Cynodon dactylon*) mixed with weedy, non-native naturalized and planted ornamental species including beach wiregrass (*Dactyloctenium aegyptium*), nut grass (*Cyperus rotundus*), wedelia (*Sphagneticola trilobata*), red-flowered sida (*Sida ciliaris*), and wide-leaved carpetgrass (*Axonopus compressus*). The native *naupaka kahakai* (*Scaevola taccada* subsp. *taccada*) and Polynesian-introduced *niu* (coconut palm; *Cocos nucifera*) are planted near park facilities. Christmas berry (*Schinus terebinthifolia*) and the native *milo* (*Thespesia populnea*) occur near the shore. Scattered *ʻākulikuli* (*Sesuvium portulacastrum*), *alena* (*Boerhavia repens*), *kīpukai* (*Heliotropium curassavicum*), *pōhuehue* (*Ipomoea pes-caprae* subsp. *brasiliensis*) and *ʻaeʻae* (*Bacopa monnieri*) also occur. The coastal strand is dominated by patches of the native *naupaka*

kahakai and native *ʻakiʻaki* (*Sporobolus virginicus*) grass, as well as scattered non-native tree heliotrope (*Heliotropium arboreum*). Other species include *maunaloa* (*Canavalia cathartica*), beach wiregrass, *alena*, and sourbush (*Pluchea carolinensis*). The landscaped vegetation along the edge of the roadways consists of maintained grass (Bermuda grass, St. Augustine grass, or wide-leaved carpetgrass) or ground cover and planted trees and shrubs including wedelia, *Pseuderanthemum carruthersii*, *Dracaena reflexa*, and oleander (*Nerium oleander*), coconut palms, areca palms (*Dypsis lutescens*), Chinese hibiscus (*Hibiscus rosa-sinensis*), and a hedge of *koa haole* (*Leucaena leucocephala* subsp. *leucocephala*). Large ficus trees (*Ficus* sp.) occur along Kauaʻi Beach Drive, and non-native ironwood (*Casuarina equisetifolia*) and the native *hau* (*Hibiscus tiliaceus*) overhang parts of Kauaʻi Beach Road. Various weedy species occur including Chinese violet (*Asystasia gangetica*), Carolina love grass (*Eragrostis pectinacea*), pitted beardgrass (*Bothriochloa pertusa*), coat buttons (*Tridax procumbens*), and creeping indigo (*Indigofera spicata*) (Tetra Tech 2025a).

The portion of the project area at Kauaʻi Community College includes landscaped areas with open, maintained lawns with native and ornamental species planted around building edges and walkways. Lawns have several grasses including St. Augustine grass, Hilo grass (*Paspalum conjugatum*), and wide-leaved carpetgrass. Low-growing weeds include love grass (*Eragrostis tenella*), nut sedge, hairy spurge (*Euphorbia hirta*), *Calyptocarpus vialis*, *Centella asiatica*, *Galinsoga parviflora*, narrow-leaved plantain (*Plantago lanceolata*), and creeping indigo. Several planted native species include *naupaka kahakai*, *milo*, *pōhinahina* (*Vitex rotundifolia*), *kokiʻo keʻo keʻo* (*Hibsicus waimeae* subsp. *waimeae*), *kou* (*Cordia subcordata*), and the endangered *loulu* palm (*Pritchardia napaliensis*). Ornamental planted non-native species include MacArthur palm (*Ptychosperma macarthurii*), fern tree (*Filicium decipiens*), *kukui* (*Aleurites moluccana*), Yeddo hawthorn (*Raphiolepis umbellata*), Chinese hibiscus, money tree (*Dracaena marginata*), snowbush (*Breynia disticha*), and *kī* (ti, *Cordyline fruticosa*) (Tetra Tech 2025a).

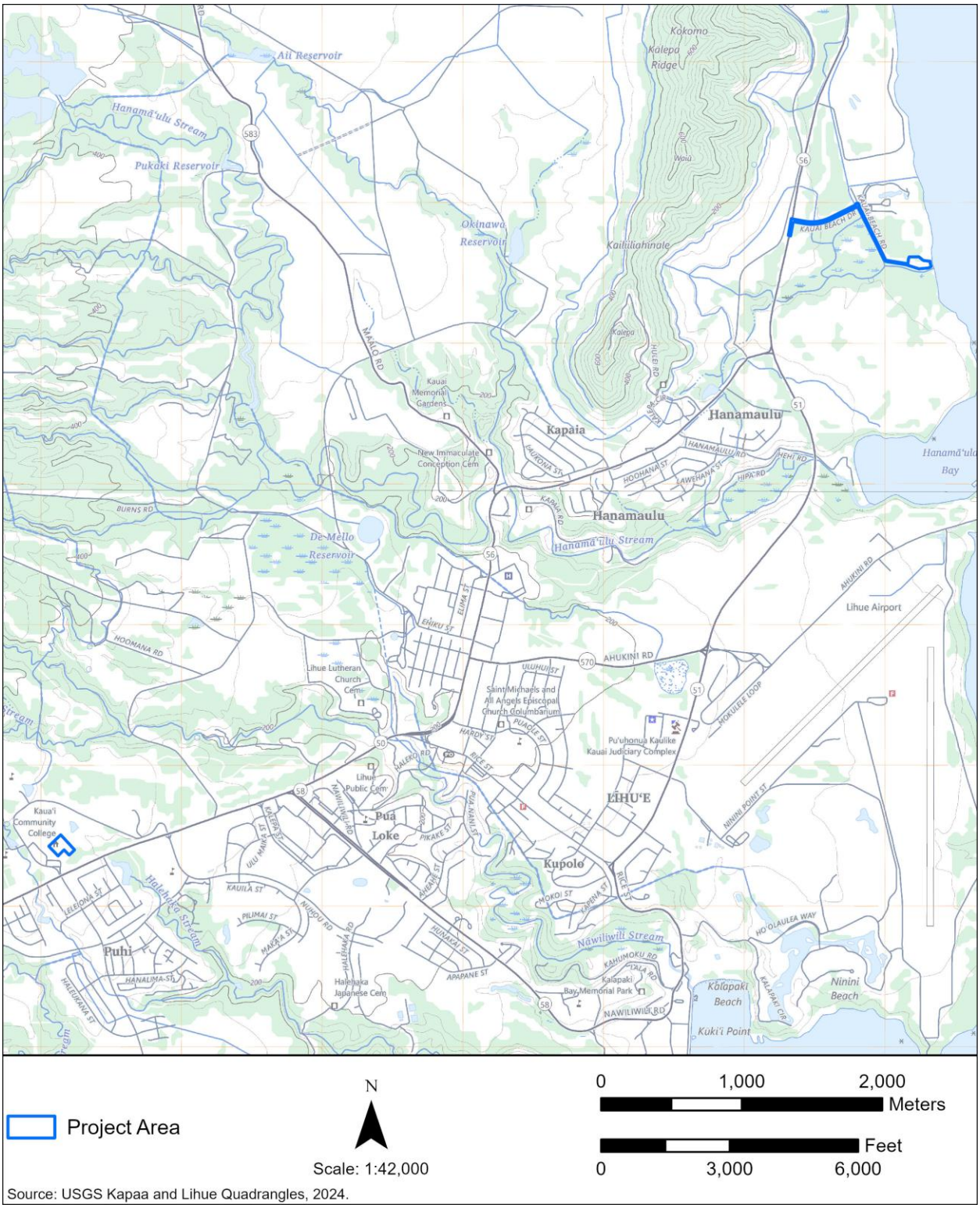


Figure 2. Location of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College on a USGS map.



Figure 3. Location of the Nukoli'i Beach portion of the HIFL project area with TMK boundaries.



Figure 4. Location of the Kauaʻi Community College portion of the HIFL project area with TMK boundaries.

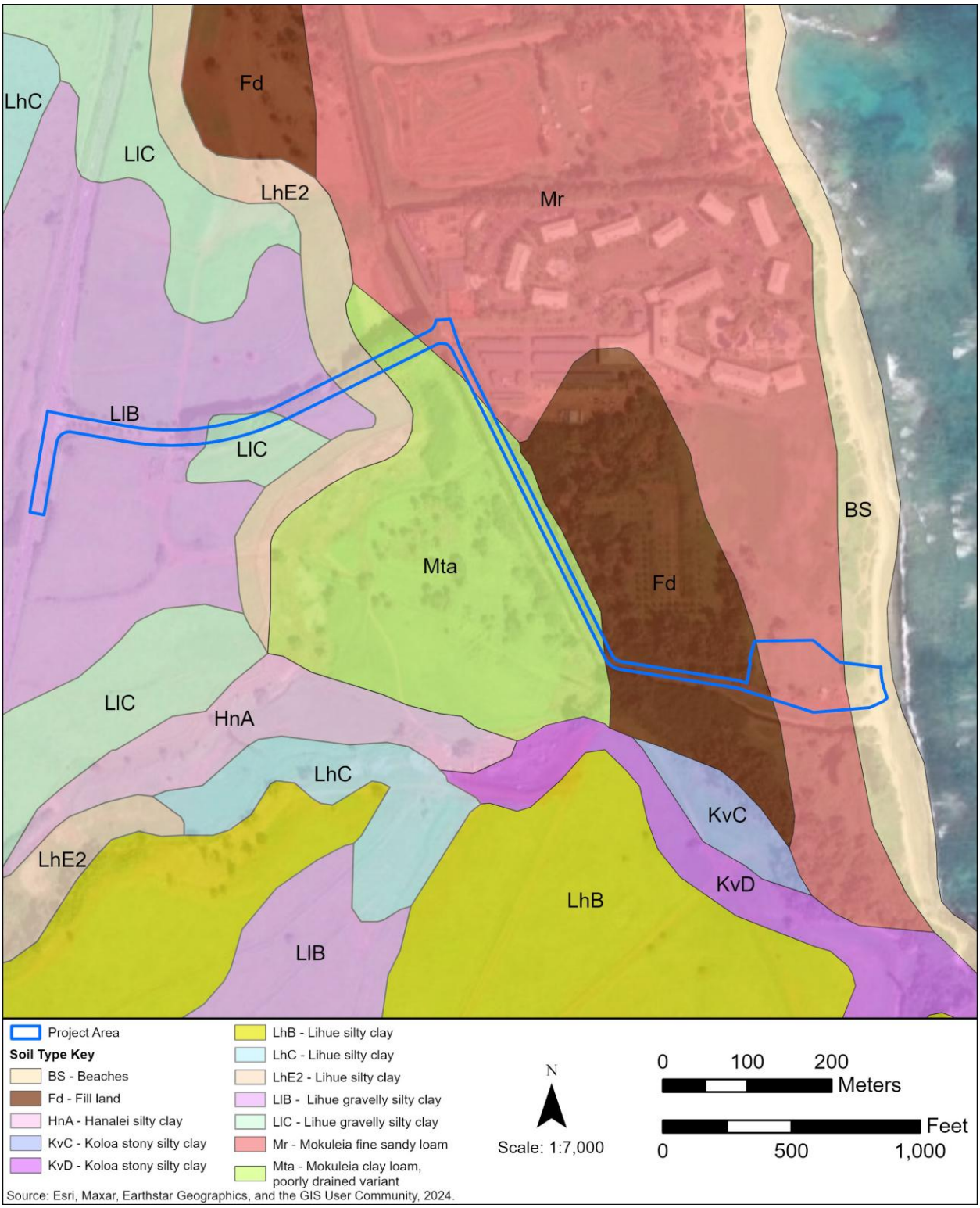


Figure 5. Soil types within and around the Nukoli'i Beach portion of the HIFL project area.

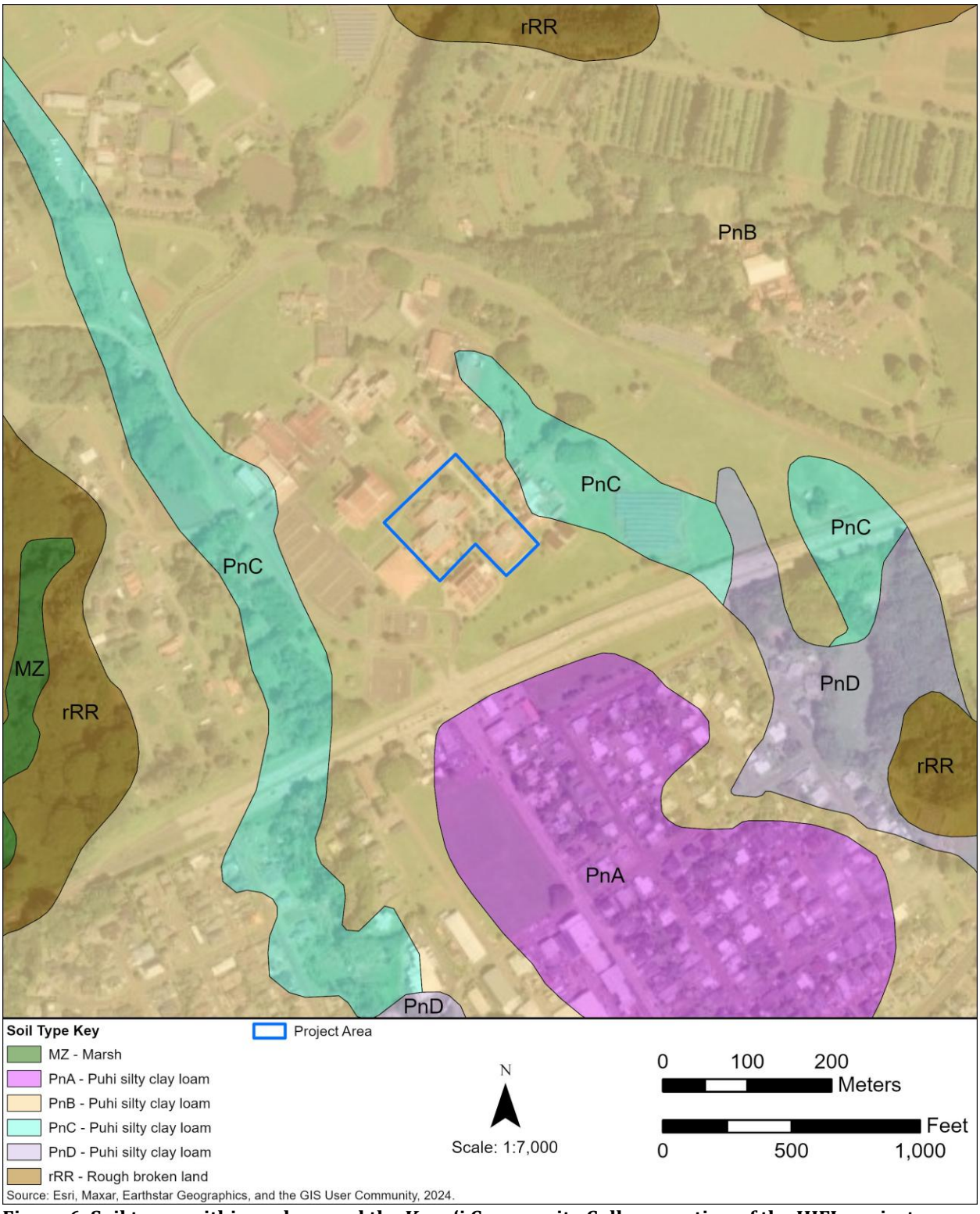


Figure 6. Soil types within and around the Kaua'i Community College portion of the HIFL project area.

1.2.2 Oʻahu Cable Landing Site

The proposed cable landfall on Oʻahu is located at Barbers Point Beach Park in Kalaeloa on the south shore of Oʻahu, in Honouliuli Ahupuaʻa in the district of ʻEwa (Figure 7 and Figure 8). The landfall would require two HDD conduits: one extending approximately 4,400 ft (1,341 m) from a BMH to the nearshore waters punchout point for the cable connecting to Kauaʻi, and the other extending approximately 5,150 ft (1,570 m) from a BMH to the nearshore waters punchout point for the cable connecting to Maui. The punchout points would be at water depths of approximately 60 ft (18 m) and 65 ft (20 m), respectively. The BMHs and associated work areas would be located in an undeveloped portion of the beach park, near the existing bathroom facilities. At the BMHs, the subsea cables would each be spliced to a terrestrial cable, which would be installed in new underground conduit to a manhole located next to an existing utility pole at the end of Olai St. From this point, the project would utilize fiber owned by a licensed utility as part of the existing utility network, generally following a route along county and state roadways to the DR Fortress data center in central Honolulu. Space within an existing building at DR Fortress would be used as the CLS for this cable landing. En route, the fiber would also connect to the UH West Oʻahu campus, with space in an existing building used as a utility access point. No ground disturbance or new construction would be necessary at DR Fortress or UH West Oʻahu.

Barbers Point is located on the ʻEwa Plain on the leeward side of the island of Oʻahu. The leeward side is sheltered from trade winds by the Koʻolau Mountains, and has higher mean temperatures, with an annual high of 85˚F and an annual low of 69˚F. The rainfall in this area is low, with a mean annual precipitation of 16.68 inches (42.4 cm). The mean monthly rainfall varies between 0.35 inches (0.89 cm) in August and 2.52 inches (6.4 cm) in December, with most rainfall occurring during the winter months (Longman et al. 2024).

The project area soils at Barbers Point Beach Park consist of coral outcrop (CR) and beach sand (BS) (Figure 9). The coral outcrop is composed of Pleistocene limestone outcrop formed from coral reefs when sea levels were upwards of 7.5 m (24.6 ft) above current sea levels (Macdonald et al. 1983:420-421). Following a drop in sea level and uplifting of the island of Oʻahu, the exposed coral reef was eroded into a karst topography characterized by limestone pits and subsurface caverns (Ziegler 2002:96). The pits are typically “bell-shaped” in cross-section because of rainwater erosion that was more corrosive in the pit interiors due to a slower evaporation rate and mixing with ground water (Ziegler 2002:97).

Vegetation includes maintained beach park vegetation and a coastal strand. The maintained vegetation includes mowed grassy areas dominated by Bermuda grass and buffelgrass (*Cenchrus ciliaris*) mixed with non-native naturalized and planted ornamental species. Weedy species growing along the edges include pitted beardgrass, Guinea grass (*Megathyrsus maximus*), wiregrass, swollen fingergrass, khaki weed, Australian saltbush (*Atriplex semibaccata*), saltbush (*Atriplex suberecta*), *Euploca procumbens*, red-flowered sida, *Calyptocarpus vialis*, *Sesuvium verrucosum*, false mallow, obscure morning glory (*Ipomoea obscura*), beggartick (*Bidens alba* var. *radiata*), slender mimosa (*Desmanthus pernambucanus*), and Indian fleabane (*Pluchea indica*). Coconut palms, shower trees (*Cassia* sp.), and *kiawe* (*Neltuma pallida*) are among the planted species. Patches of the native *pāʻū o Hiʻiaka* (*Jacquemontia sandwicensis*) are present in the grassy areas and *kīpukai*, *ʻākulikuli*, *milo*, and *ʻuhaloa* (*Waltheria indica*) are scattered. A few *naio* (*Myoropum sandwicense* subsp. *sandwicense*) are present along the western boundary. The coastal strand includes native *naupaka kahakai* and *pōhuehue*, as well as scattered *Sesuvium verrucosum*, red-flowered sida (*Sida ciliaris*), and Indian fleabane, and natives *ʻakiʻaki*, *pāʻū o Hiʻiaka*, *kīpukai*, and *ʻākulikuli* (Tetra Tech 2025b).



Figure 7. Location of the Oʻahu portion of the HIFL project area at Barbers Point Beach Park on a USGS map.



Figure 8. Location of the Oʻahu portion of the HIFL project area with TMK boundaries.



Figure 9. Soil types within and around the Oʻahu portion of the HIFL project area.

1.2.3 Maui Cable Landing Site

The proposed cable landfall on the island of Maui is located at Kahului Harbor, on the north side of Central Maui, in Wailuku Ahupua‘a in the district of Wailuku (Figure 10, Figure 11). Specifically, the cable landfall would be on the western harbor breakwater, which is an undeveloped man-made feature that is part of HDOT’s harbor facility. This site would require two HDD conduits: one extending approximately 1,322 ft (403 m) from a BMH to the nearshore waters punchout point for the cable extending to O‘ahu, and the other extending approximately 3,337 ft (1,017 m) from the same BMH to the nearshore waters punchout point for the cable extending to Hawai‘i Island. These punchout points would be at water depths of approximately 30 ft (9 m) and 42 ft (13 m), respectively. The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be located within an undeveloped area on the western harbor breakwater. At the BMH, the subsea cables would each be spliced to a terrestrial cable, which would be installed in underground conduit extending across the western breakwater under Kahului Beach Road, to a manhole sited next to an existing utility pole adjacent to the highway. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, including the overhead system along state and county roadways as well as underground conduit extending into the UH Maui College campus. The CLS for this site would be a new modular structure in the area currently used for the recycling center on the northwestern edge of the UH Maui College campus. Underground conduit would be installed between the CLS and an adjacent building on the UH Maui College campus to connect the Project with the existing telecommunication and utility network.

Wailuku Ahupua‘a is located along the windward base of Mauna Kahalawai, which exposes it to the northeasterly trade winds. Rainfall is moderate in the vicinity of the project area: annual rainfall in the northern portion is 17.5 inches (44.6 cm), and 18 inches (45.6 cm) towards the southern end. The mean monthly rainfall varies between 5.9 mm in June and 88.3 mm in January, with most rainfall occurring during the winter months (Giambelluca et al. 2013).

Soils in the Maui portions of the HIFL project area consist of fill land (Fd) throughout the majority of the cable landfall area on the western harbor breakwater, and Puuone sand (PZUE) throughout the remainder of the portion of the project area on Maui (Figure 12). Fill land includes materials from dredging, excavations from adjacent uplands, and garbage and slurry from sugar mills (Foote et al. 1972:31). These materials are usually deposited and spread over marshes, coastal areas, coral sand, and areas with shallow bedrock. Fill lands have been historically used for sugarcane (Foote et al. 1972). Since the project area includes Kahului Harbor, it is likely that the fill also includes material derived from dredging of the harbor (McElroy et al. 2024:4). Puuone sand deposits are excessively drained soils derived from coral and seashells on the low uplands of Maui. Puuone sand is on sandhills (7 to 30 percent slopes) near the ocean with elevations ranging from 50 to 350 feet. These soils are used for pasture and home sites (Foote et al. 1972).

Vegetation within the cable landfall area includes coastal strand vegetation with ironwood, Indian fleabane, Australian saltbush, buffelgrass, silky jackbean (*Canvalia sericea*), and native *‘ākulikuli*, and ruderal vegetation with non-native, low stature grasses, shrubs, and herbaceous species, such as buffelgrass, Bermuda grass, rattlepod (*Crotalaria assamica*), creeping indigo, vining cow pea (*Macroptilium atropurpureum*), swollen fingergrass (*Chloris barbata*), red-flowered sida, *koa haole* (*Leucaena leucocephala* subsp. *Leucocephala*), and sparse *‘uhaloa* and *pā‘ū-o-Hi‘iaka*. The UH Maui College has landscaped lawns of Bermuda grass and buffelgrass and plantings including coconut trees, *pōhuehue*, *hau*, and *kou*. Native *‘uhaloa* has established naturally along disturbed edges. Native *naio* is planted adjacent to the Recycling and Redemption Center. (Tetra Tech 2025c).



Figure 10. Location of the Maui portions of the HIFL project area at Kahului Harbor and UH Maui College on a USGS map.



Figure 11. Location of the Maui portions of the HIFL project area with TMK boundaries.

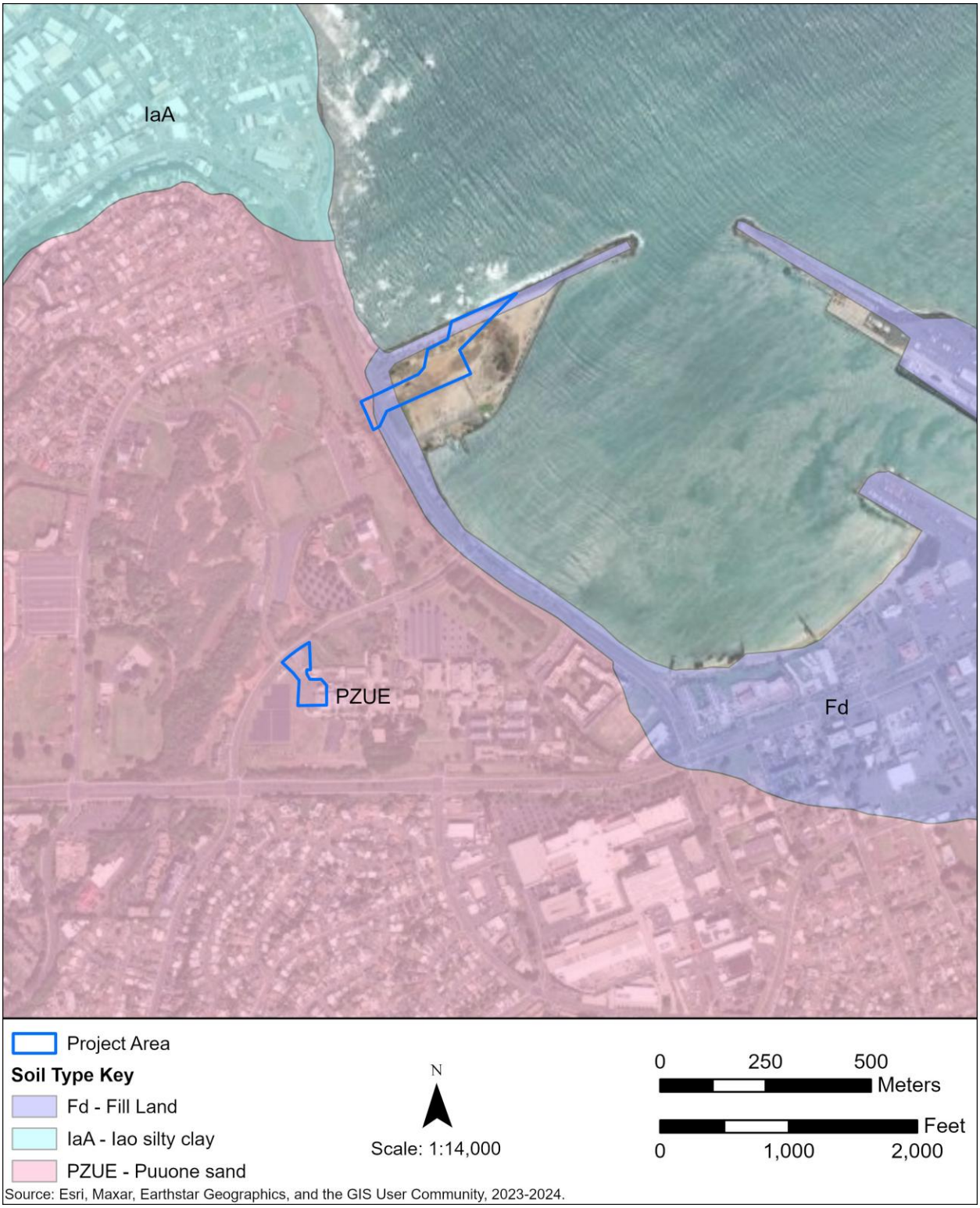


Figure 12. Soil types within and around the Maui portions of the HIFL project area.

1.2.4 Molokai Cable Landing Site

The proposed cable landfall on the island of Molokai is located north of Kaunakakai Harbor on the south side of Molokai, in Kaunakakai Ahupuaʻa within Kona Moku, within a parcel owned by the County of Maui and used by the Molokai Yacht Club (Figure 13 and Figure 14). The landfall would include a single HDD conduit, extending approximately 877 ft (267 m) from a BMH to the nearshore waters punchout point at a water depth of approximately 3 ft (1.0 m); from the punchout point, the cable would be routed along the western edge of the dredged channel associated with Kaunakakai Harbor. The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be sited in an undeveloped area adjacent to the yacht club facilities. From the BMH, terrestrial cable would be installed in an underground conduit extending to a manhole sited next to an existing utility pole adjacent to Mauna Loa Highway. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, extending along Mauna Loa/Kamehameha V Highway to an existing utility pole located near the intersection of Kamehameha V Highway and Alanui Kaimike Street. New terrestrial cable would be installed in existing underground conduit extending from the utility pole into the Molokai Education Center to connect the Project with the existing telecommunications and utility network. From the Molokai Education Center, terrestrial cable would be installed in a new underground conduit to the CLS, which would be a new modular structure located on the property of the Molokai Education Center.

Kaunakakai Ahupuaʻa is located near the midpoint of the island on its south side, facing Lānaʻi. The terrestrial landscape is drier in this area than the eastern side of the island, receiving 11-12 inches of rainfall annually (Longman et al. 2024). A large natural channel extends out from the harbor area and through the fringing reef, providing passage between ocean and land as well as a safe area for anchorage.

Soils in the portion of the project area near the Molokai Yacht Club consist entirely of Kealia silt loam (KMW) (Figure 15). The Kealia series consists of poorly-drained soils found on the coastal flats of Molokai and Maui and has a brackish water table with tidal fluctuations (Foote et al. 1972:67).

A small portion of the project area near the Molokai Education Center also lies within Kealia silt loam soils. However, the majority of this area is within the Mala silty clay (MmA) series, which are well-drained soils that formed in recent alluvium and are used for truck crops, alfalfa, orchards, and wildlife habitat (Foote et al. 1972:92).

Vegetation within the Molokai Yacht Club portion of the project area includes a non-native pickleweed (*Batis maritima*) marsh along the shoreline, western boundary, and southwestern portion of the project area, along with ruderal vegetation with non-native grasses and low-growing herbaceous weeks and shrubs, including Bermuda grass, Australian saltbush, Indian fleabane, pickleweed, fingergrass, buffelgrass, and *Sesuvium verrucosum*, as well as scattered native *kīpūkai* (Tetra Tech 2025d).

At the Molokai Education Center, vegetation includes landscaped areas with open, maintained lawns and ornamental species planted near buildings. Lawns include wide-leaved carpetgrass and creeping indigo. Native *kou* trees and *naupaka kahakai* are planted around the buildings. Three Polynesian-introduced species, *kukui* trees, *kī*, and *kalo* (taro, *Colocasia esculenta*) are also planted in the area (Tetra Tech 2025d).



Figure 13. Location of the Molokai portions of the HIFL project area at the Molokai Yacht Club and Molokai Education Center on a USGS map.

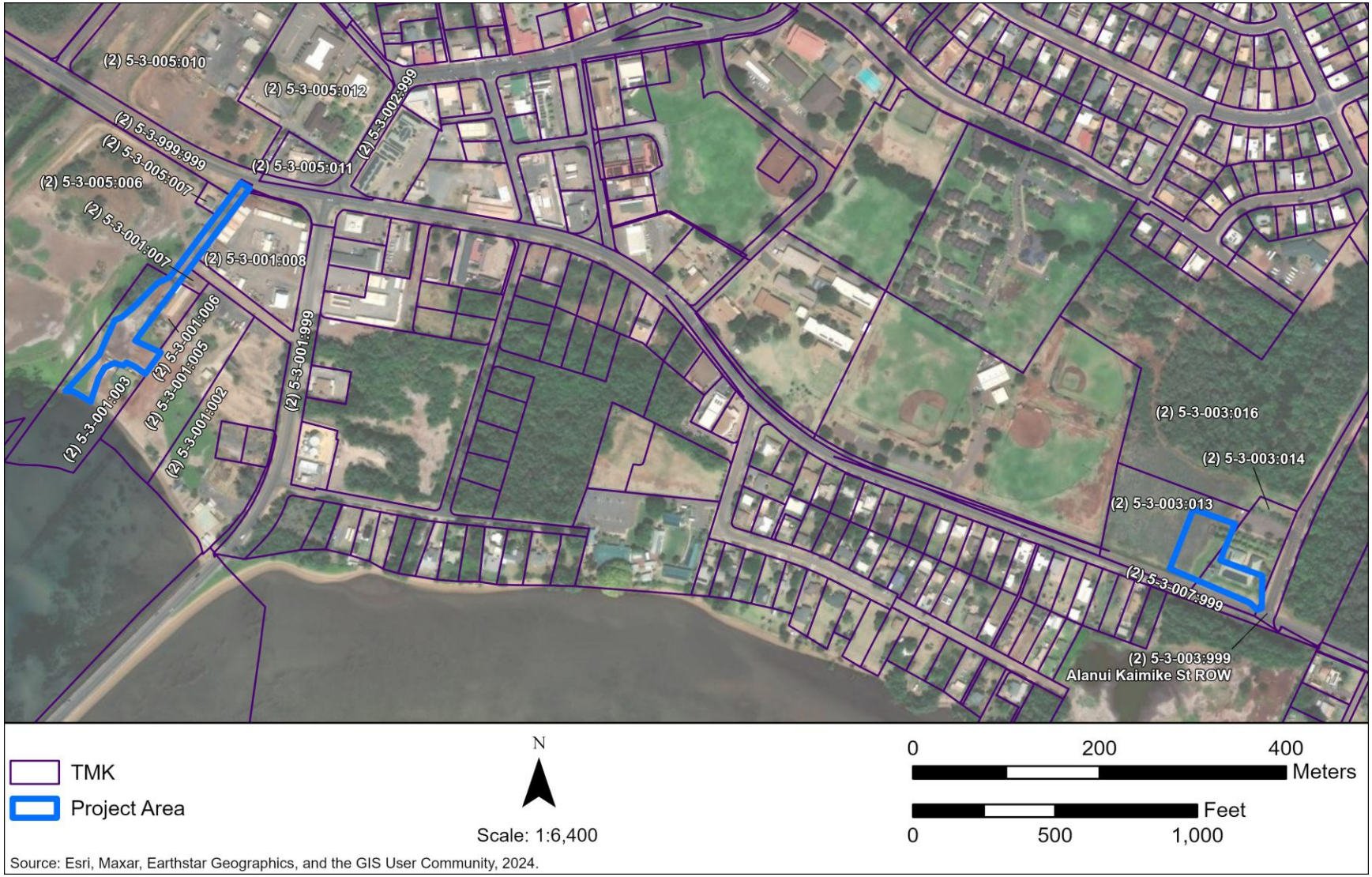


Figure 14. Location of the Molokai portions of the HIFL project area with TMK boundaries.



Figure 15. Soil types within and around the Molokai portions of the HIFL project area.

1.2.5 Lānaʻi Cable Landing Site

The proposed cable landfall on Lānaʻi is located at the Mānele Small Boat Harbor on the south side of the island, in Pālāwai Ahupuaʻa in the district of Lāhaina (Figure 16, Figure 17). The landfall would include a single HDD conduit, extending approximately 846 ft (258 m) from a BMH to the punchout point at a water depth of approximately 24 ft (7 m). The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be sited in the southern-most parking lot for the small boat harbor. From the BMH, the terrestrial cable would be installed in underground conduit to an existing manhole, where the Project would interconnect with the island's existing telecommunication network. From this point, the project would utilize fiber owned by a licensed utility as part of the existing telecommunication network, generally following a route along existing roadways to the UH Maui, Lānaʻi Education Center in Lānaʻi City. Space within an existing building at the Lānaʻi Education Center would be used as the CLS. No ground disturbance or construction will be required at the Lānaʻi Education Center.

The island of Lānaʻi sits within the rain shadow of the island of Maui, the much larger nearby high island within the archipelago. Mean annual rainfall in the vicinity of the project area is approximately 16.14 inches (41 cm) (Giambelluca et al. 2013).

The soils within the project area at Mānele Harbor primarily consist of Sandy Alluvial Land (rSL), which are found along the narrow coastal plains in the northern and northeastern regions of Lānaʻi. It is made up of recent stream deposits, featuring sandy soils with minimal pebbles or stones, and prone to flooding during rainy season (Foote et al. 1972:119,120). The remainder of this portion of the project area consists of Jaucas Sand (JaC) and Very Stony Land (rVs) (Figure 18).

Vegetation within this portion of the project area includes landscaped areas in the northern and central portions project area along the road edges and around the harbor infrastructure. Landscaping includes maintained lawns with wide-leaved carpetgrass and Hilo grass, and plantings of non-native ornamental plants bordering the lawns including Swiss-cheese plant (*Monstera deliciosa*), monkeypod (*Samanea saman*), and Manila palm (*Veitchia merrillii*). Weedy species have intruded into the landscaped areas and include swollen fingergrass (*Chloris barbata*), Carolina love grass, and Oriental hawksbeard (*Youngia japonica*). Few native species planted within this vegetation type include *kou*, *milo*, *pōhinahina*, and *pōhuehue*. Scattered native *ʻuhaloa* and hoary abutilon (*Abutilon incanum*) grow naturally along the disturbed edges of the landscaped vegetation. The kiawe/buffelgrass forest vegetation type occurs as a relatively narrow band along the southern margin of the project area. It includes moderately open to dense stands of *kiawe* trees with an understory of sparse to moderately dense patches of buffelgrass. Non-native weedy plants include golden crown-beard (*Verbesina encelioides*), spiny amaranth, obscure morning glory, bitter melon, and yellow wood sorrel (*Oxalis corniculata*). The native *ʻuhaloa* occurs rarely, and hoary abutilon is moderately common (Tetra Tech 2025e).

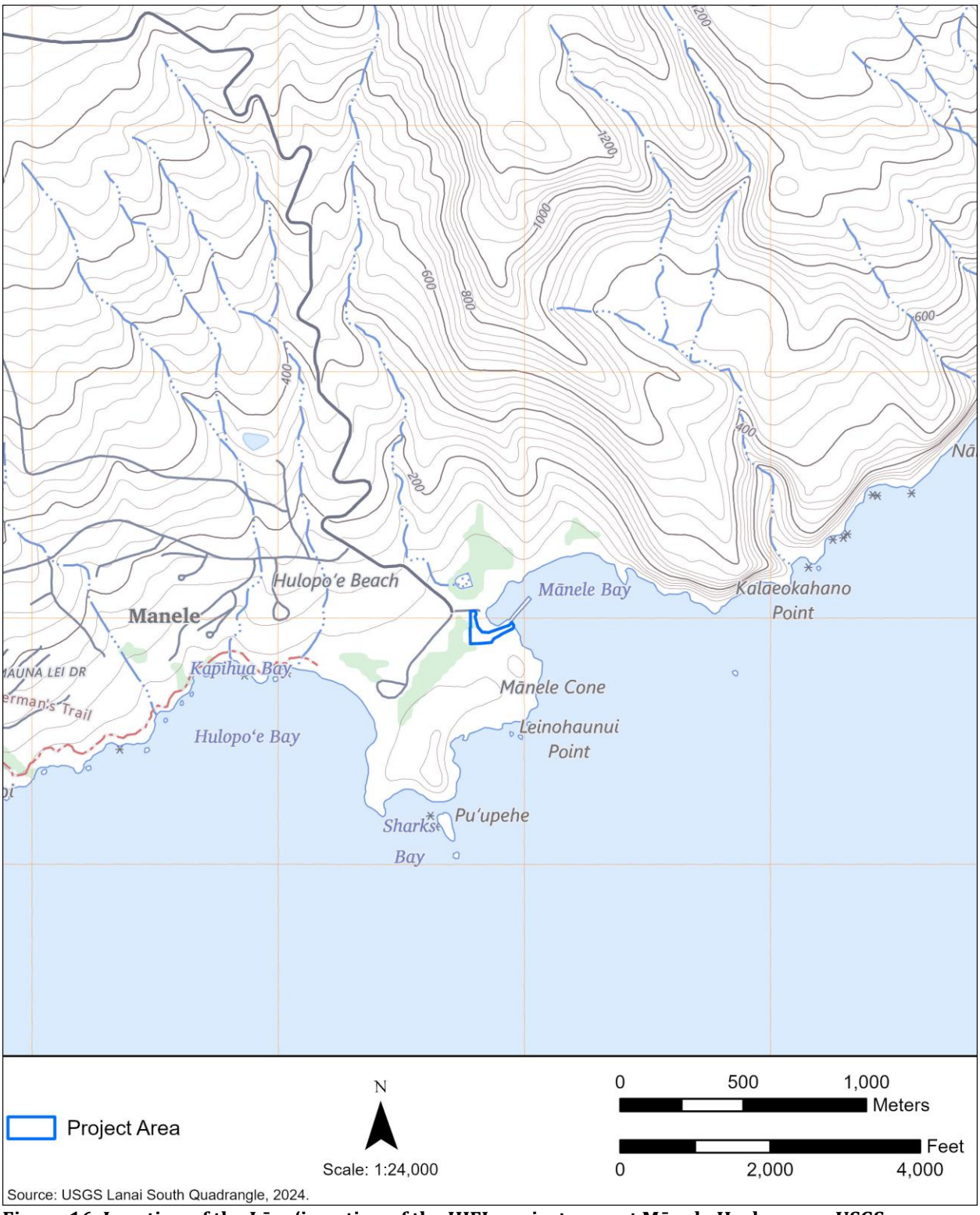


Figure 16. Location of the Lānaʻi portion of the HIFL project area at Mānele Harbor on a USGS map.



Figure 17. Location of the Lānaʻi portion of the HIFL project area with TMK boundaries.

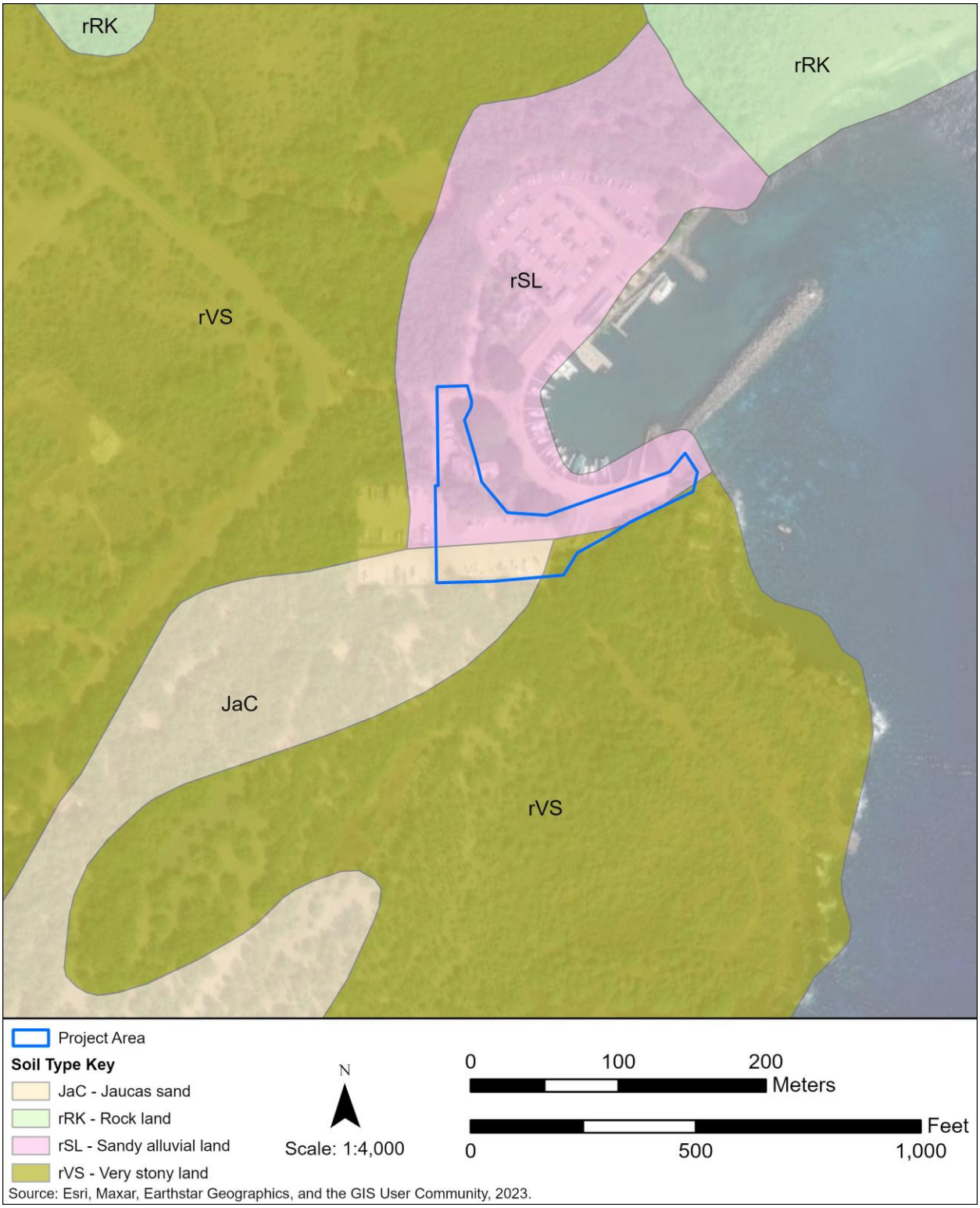


Figure 18. Soil types within and around the Lānaʻi portion of the HIFL project area.

1.2.6 Hawai‘i Island Cable Landing Site

The proposed cable landfall on Hawai‘i Island is located at PACRC, just east of the Hilo Harbor breakwater on the east side of the island, in Waiakea Ahupua‘a in the district of South Hilo (Figure 19, Figure 20). The landfall would include a single HDD conduit, extending approximately 1,185 ft (361 m) from a BMH to the nearshore waters punchout point at a water depth of approximately 61 ft (19 m). Given the presence of wastewater utility infrastructure in the immediate vicinity of the cable landfall, the HDD conduit would be specifically sited to facilitate crossing and avoid impacts to the buried wastewater pipes. The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be located in an undeveloped portion of the PACRC site. From the BMH, the terrestrial cable would be installed in underground conduit to a manhole installed adjacent to a nearby utility pole. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, including the overhead system along state and county roadways as well as underground conduit extending into the UH Hilo campus (Figure 21). The CLS for this site would be a new modular structure constructed on the northern side of the UHH campus near Lanikāula Street. An additional underground conduit would be installed from the CLS to an adjacent building on the UHH campus to connect the project with the existing telecommunication and utility network.

Hilo is one of the wettest cities in the United States. Rainfall within the Hawai‘i Island portions of the HIFL project area average 130 inches (330.3 cm) per year, with rainfall remaining relatively consistent throughout the year and generally increasing dramatically in November (Giambelluca et al. 2013).

The Hawai‘i Island portions of the HIFL project area lie within three different soil types. The PACRC portion of the project area is within the Opihikao-Urban Land Complex (Figure 22), and the portion of the project area at the UH Hilo campus is within the Panaewa-Urban Land Complex and Keaukaha Highly Decomposed Plant Material (Figure 23).

Sato et al. (1973:43) describe the Opihikao-Urban Land Complex soil type as well-drained, thin organic soils over pahoehoe lava bedrock. The soil appears at sea level and into the uplands as high as 1,000 feet where rainfall ranges from 60 to 90 inches per year. The mean annual soil temperature is between 72° and 73°F (Sato et al. 1973). Opihikao soils are extremely rocky muck (3 to 25 percent slopes) and are gently sloping and moderately steep soils. The muck is strongly acidic. Opihikao soils are associated with native forests or are used for pasture (Sato et al. 1973).

The Panaewa-Urban Land Complex is described by Sato et al. (1973:45) as shallow, moderately well drained silty clay loams. These soils form in volcanic ash. The soils are nearly level to gently sloping and are found on uplands at elevations ranging from 300 to 1,000 feet where rainfall ranges from 100 to 175 inches per year. The mean annual soil temperature is between 72° and 74°F (Sato et al. 1973:45). The natural vegetation consists of *‘ōhi‘a* (*Metrosideros polymorpha*), tree fern, Hilo grass (*Paspalum conjugatum*), California grass (*Urochloa mutica*), and guava (*Psidium guajava*). The soils are used for sugar cane, pasture, and woodland. Permeability is rapid, runoff is slow, and the erosion hazard is slight (Sato et al. 1973:45-46).

The Keaukaha Soil Series is described by Sato et al. (1973:27) as well-drained, thin organic soils which overlay pahoehoe lava bedrock and occupy the low areas of Mauna Loa. These soils are found from near sea level to 1,000 feet in elevation where rainfall ranges from 90 to 150+ inches per year. The mean annual soil temperature is between 72° and 74°F (Sato et al. 1973:27). The soils are used

for woodland, pasture, and home sites. The soil above the pahoehoe lava is rapidly permeable, and the pahoehoe is very slowly permeable, with water running rapidly through the cracks. The runoff is medium and the erosion hazard is slight (Sato et al. 1973:27).

Within the cable landfall portion of the project area at PACRC, the natural terrain has been impacted by mechanical alteration and bulldozing from previous projects and development (Haun and Henry 2000). PACRC contains maintained lawns dominated by Hilo grass, with ornamental plantings around buildings, roads, and fenceline edges and agricultural crops planted in discrete areas. Weedy species along the lawn edges include Guinea grass (*Megathyrsus maximus*), tick clover (*Grona triflora*), and *Spermacoce exilis*. Plantings of ornamental herbs, shrubs, and small trees include wedelia, fiddlewood (*Citharexylum caudatum*), and the Polynesian-introduced *kī*. Cultivated agricultural crops such as *kalo*, sugar cane (*Saccharum officinarum*), and cassava (*Manihot esculenta*) are growing in small, discrete areas in the southern portion of the project area. False kamani (*Terminalia catappa*) trees and coconut palms occur near the shoreline. The indigenous sedge *Cyperus polystachyos* occurs infrequently as well. A coastal strand including the native *naupaka kahakai*, as well as non-native coconut palms and false *kamani* trees is also present (Tetra Tech 2025f).

The vegetation at the UH Hilo campus is landscaped with maintained lawns and various planted ornamental shrubs and large trees. The lawns are dominated by wide-leaved carpetgrass and Hilo grass. Trees planted in the area include coconut palm, octopus tree (*Schefflera actinophylla*), African tulip (*Spathodea campanulata*), autograph tree (*Clusia rosea*), *Tabebuia heterophylla*, and paperbark (*Melaleuca quinquenervia*). Weedy plants growing within and on the edges of landscaping include silver fern (*Pityrogramma calomelanos*), artillery plant (*Pilea microphylla*), milkwort (*Polygala paniculata*), *maile honohono* (*Ageratum conyzoides*), oriental hawksbeard, *maile pilau* (*Paederia foetida*), and bearded begonia (*Begonia hirtella*). No native plant species were observed within the UH Hilo portion of the project area during the biological survey for this project (Tetra Tech 2025f).



Figure 19. Location of the Hawaiʻi Island portions of the HIFL project area at PACRC and UH Hilo on a USGS map.



Figure 20. Location of the PACRC portion of the HIFL project area with TMK boundaries.



Figure 21. Location of the UH Hilo portion of the HIFL project area with TMK boundaries.



Figure 22. Soil types within and around the PACRC portion of the HIFL project area.

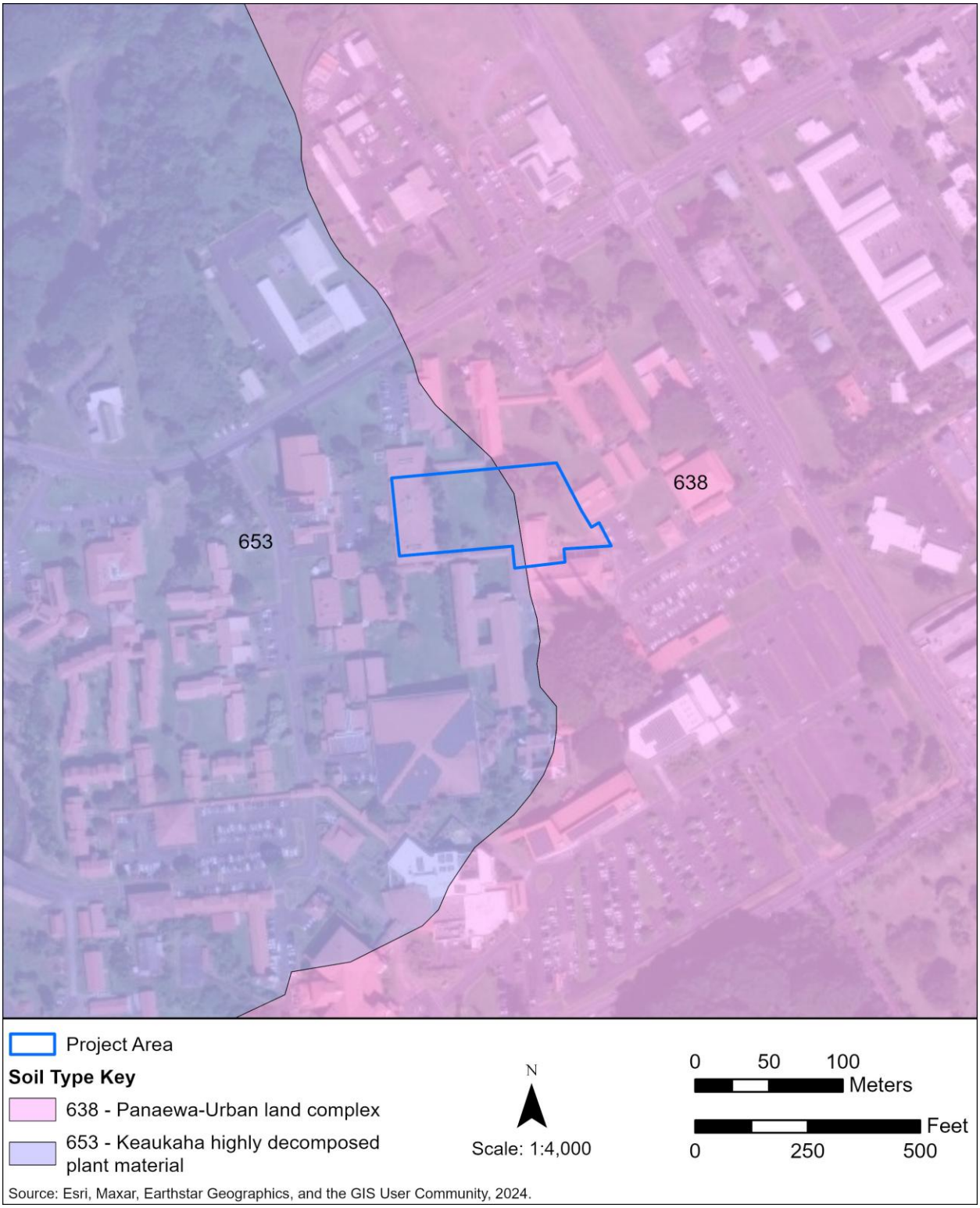


Figure 23. Soil types within and around the UH Hilo portion of the HIFL project area.

2.0 ARCHIVAL AND BACKGROUND RESEARCH

As described in Section 1, the terrestrial components of the HIFL project include six cable landing sites at the following locations:

- Kauaʻi: Nukoliʻi Beach, Hanamāʻulu and Niumalu Ahupuaʻa, Puna Moku (modern tax district of Līhuʻe)
- Oʻahu: Barbers Point Beach Park, Honouliuli Ahupuaʻa, ʻEwa Moku
- Maui: Kahului Harbor, Wailuku Ahupuaʻa, Wailuku Moku
- Molokai: Molokai Yacht Club, Kaunakakai Ahupuaʻa, Kona Moku
- Lānaʻi: Mānele Harbor, Pālāwai Ahupuaʻa, Lāhaina District
- Hawaiʻi Island: Pacific Aquaculture and Coastal Resource Center (PACRC), Hilo, Waiākea Ahupuaʻa, South Hilo District

Given the distributed geographic scope of the project, a summary of background and archival research is presented for each cable landing site separately below. For full in-depth background information on each site, the reader is referred to the Cultural Impact Assessment (CIA) and Ka Paʻakai Analysis for the HIFL project (Swift et al. 2025).

2.1 KAUAʻI CABLE LANDING SITE

2.1.1 Archival Research Summary

The Kauaʻi portions of the HIFL project area span two *ahupuaʻa* (traditional land division), Hanamāʻulu and Niumalu, within the *moku* (district) of Puna. Many of the oral historical accounts of Hanamāʻulu recount the canoe landings in the area, which were made easy in the protected bays. The *moʻolelo* (oral traditions) also suggest the likelihood of Hanamāʻulu as the residence of some *aliʻi* (chiefs), as well as the presence of a major *heiau* (place of worship) of *poʻokanaka* (human sacrifice) class. Intensive agriculture was practiced across Hanamāʻulu, including *loʻi kalo* (irrigated taro fields) (Handy 1940:67). Many of the oral historical accounts of Niumalu discuss the botanical landscape, including coconut trees, which are associated with the place name (Pukui et al. 1974:166, Fornander 1918:224), as well as *mokihana* (*Melicope anisata*), a species endemic to Kauaʻi. *Mele* (songs) also recount the beauty of the area, in addition to the florals. Alakoko Fishpond is one of the most storied locations in Niumalu Ahupuaʻa, and its construction is often attributed to *menehune* (a legendary race of people), commissioned by *aliʻi*. Handy (1940:67) observed that despite the small size of Niumalu Ahupuaʻa, it was one of the most important areas for fishing on Kauaʻi. Archival sources highlight the population center which grew on the southeastern shore of Kauaʻi, which is now known as the city of Līhuʻe.

The entirety of Hanamāʻulu and Niumalu Ahupuaʻa were awarded to Victoria Kamāmalu, granddaughter of Kamehameha I, as part of a Konohiki Land award (LCA 7713, ʻĀpana 2). The *ahupuaʻa* of Niumalu was passed from Kamāmalu, to her father, Kekuanaoa, then to her brother Kamehameha V. Upon his death, it was inherited by her half-sister Ruth Keʻelikolani, who later sold the land to Paul P. Konoa in 1883 (Ching et al. 1973). Although no LCAs were identified within the Kauaʻi portions of the HIFL project area and the immediate vicinity, there are around 20 Kuleana Land awards claimed within Hanamāʻulu Ahupuaʻa (Soltz et al. 2014) and 24 within Niumalu Ahupuaʻa (Kamai et al. 2016). Most of the awards in both *ahupuaʻa* are described as including *loʻi*,

kula (open country, pasture) lands, and house lots (Kamai et al. 2016). Large-scale sugarcane cultivation was the notable post-Contact agricultural endeavor, along with dairy operations.

Beginning in the 1850s, sugarcane agriculture became a major commercial enterprise within both Hanamāʻulu and Niumalu Ahupuaʻa with the establishment of the Lihue Plantation and Grove Farm (Figure 24). Much of the infrastructural development in this area through the nineteenth and early twentieth centuries was tied to the growth of commercial sugarcane agriculture. This included large-scale irrigation infrastructure which diverted water into sugarcane fields, plantation railway systems, mills, Ahukini Pier, and plantation housing for a multi-ethnic labor force. Grove Farm's Puhi Camp was constructed in the location of the present-day Kauaʻi Community College.

Following the December 7, 1941, Japanese attack on Pearl Harbor, Kauaʻi became a strategic site for U.S. military defense. In December 1941, a Japanese submarine surfaced multiple times in Nāwiliwili Harbor and shelled the shoreline with little to no reported damage. An entire battalion of military personnel were deployed to Kauaʻi in the spring of 1942. The enlisted men were assisted by the Kauai Volunteers, three battalions of about 2,200 citizens. The volunteers, mostly Filipino sugar-laborers, were instructed to man the approximately 150 pillboxes located around Kauaʻi's coastline for beach defense (Bennett 2003:66-77). During World War II, acreages of Grove Farm were used to grow food for the military and the local population, and were also designated as artillery impact areas bordering jungle training areas (Kamai et al. 2016:27).

The land to the north of the Nukoliʻi Beach portion of the project area was acquired in the 1970s; from the 1970s through the 1990s, it was the subject of much community opposition to resort development (Turner 1981, Evslin 2016). Ultimately, the resort was built, and the completed resort, today the Outrigger Kauaʻi Beach Resort & Spa, stands as a reminder of the island's shift toward a resort-based economy.

Also in the 1970s, 200 acres of Grove Farm's prime cane land was acquired by the University of Hawaiʻi to build Kauaʻi Community College. Over the ensuing two decades, Puhi Camp was demolished in order to construct the new campus (Figure 25).



Figure 24. An 1878 Government Survey map showing the Lihue Plantation (red arrow) and Grove Farm (orange arrow) sugarcane fields in the area of present day Līhuʻe Town. Note the present day Kaumualiʻi Highway depicted here as an unimproved road.

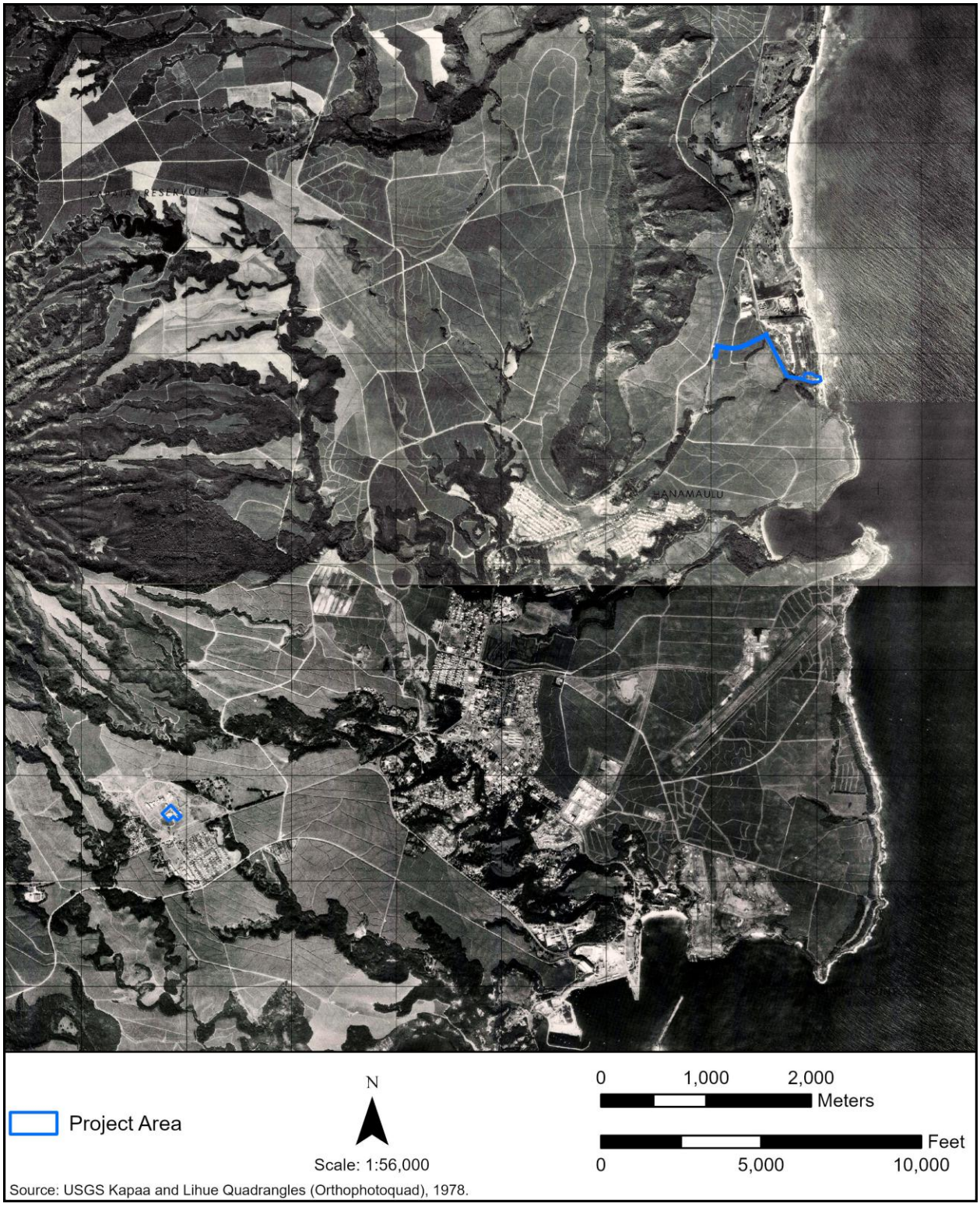


Figure 25. A 1978 USGS orthophoto of southeastern Kauaʻi. Note the development in the vicinity of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College, as well as the urbanization of Līhuʻe Town.

2.1.2 Previous Archaeology

A total of 21 archaeological studies have been conducted within 0.5 miles (0.8 km) of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College, resulting in the identification of 11 historic properties. Archaeological investigations specific to the Nukoliʻi Beach portion are presented in Table 1 and shown in Figure 26, and those specific to the Kauaʻi Community College portion are presented in Table 2 and shown in Figure 27. Collectively, Table 1 and Table 2 provide an overview of all 21 investigations with a summary of their findings. All previously identified historic properties within the 0.5-mile buffer are described in Table 3 (Nukoliʻi Beach portion) and Table 4 (Kauaʻi Community College portion), which also contain significance assessments and mitigation recommendations. These historic properties are presented in Figure 28 (Nukoliʻi Beach portion) and Figure 29 (Kauaʻi Community College campus portion).

Nukoliʻi Beach

A total of five historic properties reflecting both pre- and post-Contact activities have been identified within 0.5 miles of the Nukoliʻi Beach portion of the HIFL project area. Pre-Contact historic properties include a habitation complex with two cultural deposit features (SIHP 50-30-08-01838), as well as a reinterment area for inadvertently discovered *iwi kūpuna* within the southeastern portion of the project area, closest to the beach. A portion of a larger burial complex (SIHP 50-30-08-00103) consisting of 44 burials and 42 isolated finds from previously disturbed burials is located north of the project area. The burials and isolated finds recorded as SIHP -00103 were reinterred at a protected location within Wailua Golf Course. Post-Contact historic properties include a drainage canal that crosses the northern portion of the project area (SIHP 50-30-08-02235), a concrete bridge (SIHP 50-30-08-01846), and an irrigation ditch (SIHP 50-30-08-00885) associated with the sugar plantation industry.

Two historic properties have been documented within the current project area: SIHP 50-30-08-01838 and SIHP 50-30-08-02235. SIHP 50-30-08-01838 is a pre-Contact habitation complex with two subsurface cultural deposit features (Feature A and Feature B), located in the southeastern portion of the project area, closest to the beach. SIHP -01838 was initially identified by Walker et al. (1991) and subsequently reidentified by Corbin et al. (2002). Corbin et al. identified Feature A as a cultural deposit, "exposed in a cut sand bank," which was "composed of charcoal-stained sand and contained sparse shell midden" (2002:25). Similarly, Feature B was identified as a cultural deposit exposed "on the surface of a sand dune," which was "composed of charcoal-stained sand and contained sparse marine shell" (2002:26). Corbin et al. (2002) assessed SIHP -01838 as significant under Criteria a and d and recommended preservation "as is" (PAI). The historic property also contains a reinterment area for inadvertently discovered *iwi kūpuna* identified within Nukoliʻi Beach Park. The burials were reinterred at a protected location within the project area (On File, SHPD).

SIHP 50-30-08-02235 is a post-Contact ditch (Soltz et al. 2014) that runs along the *mauka* side of Kauai Beach Road, crossing the project area to the north. Soltz et al. (2014) provided the following description of SIHP 50-30-08-02235:

> SIHP # 50-30-08-2235 consists of a section of a drainage ditch in the northern portion of Hanamā'ulu Ahupuaʻa. The ditch is oriented NW/SE roughly paralleling the coast. It extends along the makai (seaward) edge of a former swamp (now filled-in) located about 500 m inland of the coast, as shown on the 1910 USGS Topographical map… Although outside the

> project area, the top of the eastern bank of the ditch is in close proximity, approximately 2.0 m west of the project boundary. The extent of SIHP # -2235 adjacent to the project area includes only a section within Hanamāʻulu Ahupuaʻa, which connects two natural drainages that once originated in the swamp. There is no evident earth berm surrounding the ditch and no stonework...
>
> SIHP # -2235 ditch in Hanamāʻulu ahupuaʻa is approximately 635 m long. From its southern end, the ditch proceeds north from a natural drainage … that originated from the swamp to the west and extended to the sea. The ditch proceeds northerly to the boundary of Hanamāʻulu and Wailua passing to the west side of the project area and a sewage treatment plant on the northwest comer of the Kauaʻi Beach Resort ... Beyond the project area to the north and beyond the north boundary of Hanamaʻulu ahupuaʻa the ditch splits … with one channel continuing in a northerly direction and another forming a T (perpendicular intersection) proceeding in an easterly direction to the sea. This second ditch, oriented generally east-west extends in a straight line from north of the sewage treatment plant to the coast at Kawailoa (also called Nukoliʻi) Beach, as shown on a 1963 USGS map ... This second ditch does not follow a natural drainage, however it is close to the alignment of an old stream that drained the northern end of the inland swamp. The ditch terminates at the mouth of this old stream…
>
> The drainage ditch does not appear on a 1910 U.S.G.S. map …, nor on a 1941 Lihue Plantation map ... The alignment of the ditch does follow the alignment of the Ahukini Terminal & Railway Co. (AT&R) railroad track, built in 1921, which connected several sugar plantations north of the project area to Ahukini Landing on the south side of Hanamāʻulu Bay (Conde and Best 1973:185)... In 1959, most sugar plantations had switched to hauling the sugar cane by truck rather than by train, so this section of the old AT&R track would have been abandoned by this time, if not earlier (Conde and Best 1973:168). No evidence of the old track or rail bed was observed in the vicinity of the project area. The drainage ditch does appear on a 1963 U.S. topographic … and all subsequent maps. From the historic maps, it is evident that this ditch was built sometime between 1941 and 1963 and probably after the abandonment of the railroad in 1959. The ditch is within TMK 3-7-003:017… (Soltz et al. 2014:57-58).

Soltz et al. (2014) assessed SIHP -02235 as significant under Criterion d. The project-specific effect recommendation was "no historic properties affected, with proposed mitigation commitments," consisting of the placement of temporary fencing or a barricade between the bank and the ditch, which was advised to prevent construction debris from falling in. No further archaeological work was recommended (Soltz et al. 2014:60-61).

Kauaʻi Community College

Six historic properties have been identified within 0.5 miles of the portion of the project area located at Kauaʻi Community College. Most of these are associated with plantation-era infrastructure and post-Contact activities reflecting a variety of functions, including agriculture, habitation, burial, transportation, and refuse disposal. These features include irrigation and water control infrastructure from the Lihue Plantation (SIHP 50-30-11-02179), a cemetery associated with Grove Farm's Puhi Camp (SIHP 50-30-11-B006), a subsurface trash deposit linked to plantation-era occupation (SIHP 50-30-11-02307), a historic residence (Kilohana/Gaylord P. Wilcox House; SIHP 50-30-11-09339), Grove Farm Company Locomotives (SIHP 50-30-11-09381), and Grove Farm office building (No SIHP). No historic properties have previously been identified within the Kauaʻi Community College portion of the HIFL project area.

Table 1. Previous Archaeological Studies Within 0.5 Miles of the Nukoli'i Beach Portion of the HIFL Project Area

Reference	Type of Study	Findings
Bennett 1931	Island-Wide Survey	Identified one historic property within 0.5 miles of the current project area: a dune burial site (later assigned SIHP 50-30-08-00103). No significance assessment or recommendations were made.
Walker et al. 1991	Archaeological Inventory Survey	Identified 10 historic properties, two of which are located within 0.5 miles of the current project area: SIHP 50-30-08-01838, a pre-Contact habitation complex with two features, a mound that was possibly displaced by bulldozing activity, and a sandy surface containing marine midden within the Nukoli'i Beach portion of the project area; SIHP 50-30-08-01846 includes two post-Contact bridges associated with railroad use, constructed over and between two drainage ditches. Both SIHP -01838 and -01846 were assessed as significant under PHRI category A (important for information content) and recommended for further data collection (FDC). Additionally, SIHP -01838 received a provisional assessment for PHRI significance category C (culturally significant) and was recommended for preservation "as is" (PAI).
Fager and Spear 2000	Archaeological Monitoring	Documented one previously documented historic property (SIHP -00103, a dune burial site) that is partially within 0.5 miles of the current project area. SIHP -00103 consists of 44 burials and 42 isolated finds from previously disturbed burials likely associated with the pre-Contact period. Only three burials were identified *in situ.* SIHP -00103 was assessed significant under Criteria d and e and all recovered burials and isolated finds were reinterred at a protected location within Wailua Golf Course.
Corbin et al. 2002	Archaeological Inventory Survey	Documented 10 previously identified historic properties, one of which, SIHP -01838 is within the current project area, and one of which, -01846, are located within 0.5 miles of the current project area. Both sites were assessed significant under Criteria a and d and recommended for preservation "as is" (PAI).
Dega and Powell 2003	Archaeological Monitoring	Documented 10 previously identified historic properties, one of which, SIHP 50-30-08-00885, is located within 0.5 miles of the current project area. This site consists of a partial irrigation ditch tunnel associated with the sugar plantation industry. It was assessed as significant under Criterion d and recommended for no further work.
Mason Architects, Inc. 2003	Historic Resources Survey, Evaluation, and Impact Assessment	Identified 38 historic buildings considered potentially eligible for the National Register, none of which are within 0.5 miles of the current project area.
Yorck et al. 2004	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Soltz et al. 2014	Archaeological Inventory Survey	Identified one historic property, a portion of which is within the current project area. SIHP 50-30-08-02235 is a post-Contact drainage canal. The site has been recommended for inclusion on both the National and the Hawai'i Register of Historic Places and is assessed as significant under Criterion d. No further work was recommended, and protective measures were suggested to prevent debris from entering the canal during construction activities.

Note: Previous studies that include the current project area are highlighted in gray.

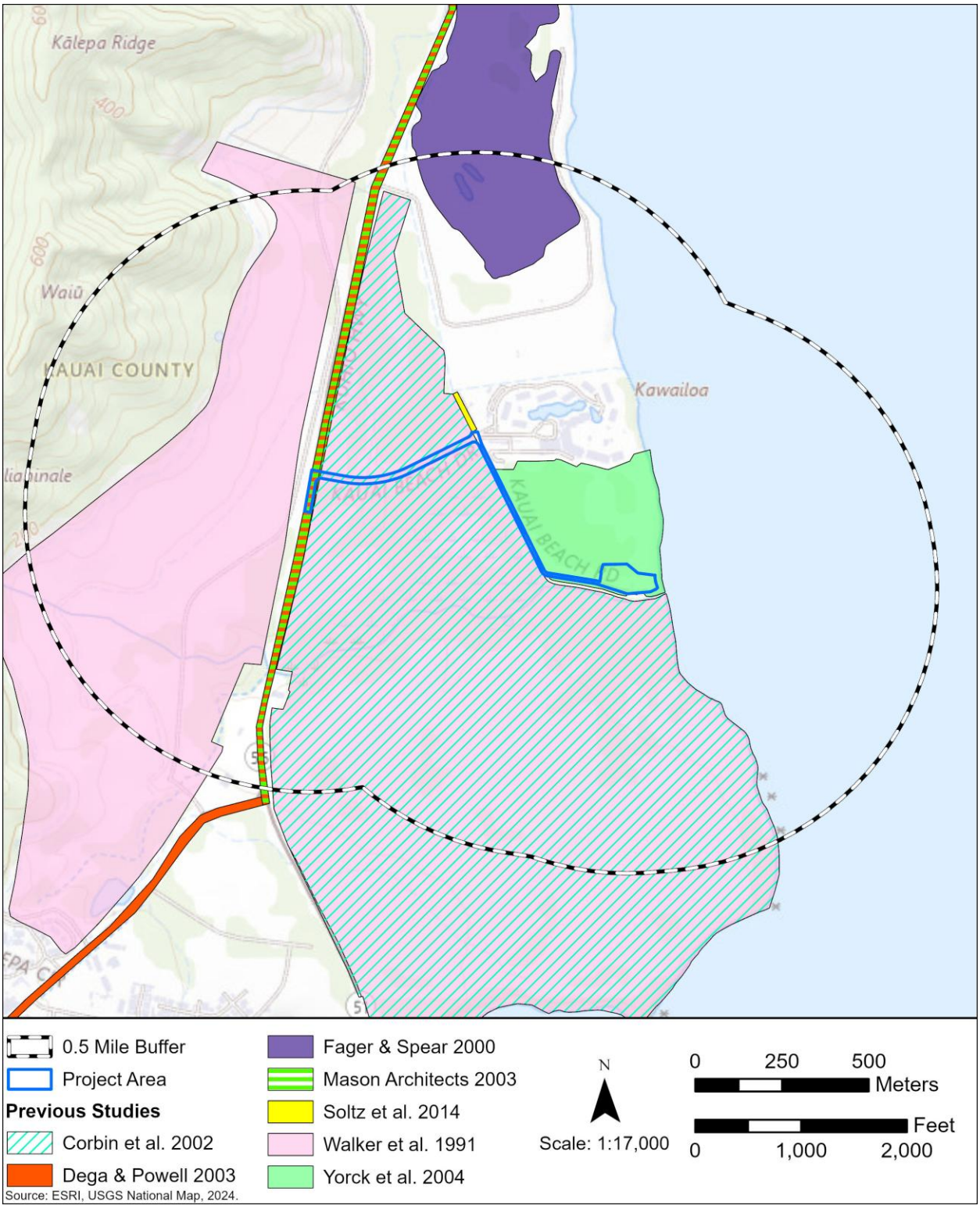


Figure 26. Previous archaeological studies conducted within 0.5 miles of the Nukoli'i Beach portion of the HIFL project area.

Table 2. Previous Archaeological Studies Within 0.5 Miles of the Kauaʻi Community College Portion of the HIFL Project Area

Reference	Type of Study	Findings
Palama 1973	Archaeological Reconnaissance	Identified two old irrigation systems containing cement gates and overflows associated with the sugar cane industry, roads, tunnels and other features linked to the WWII era, a historic Japanese Cemetery (later designated as the Puhi Camp Cemetery and assigned SIHP 50-30-11-B006), remains of an old plantation camp, and *loʻi*. No SIHP numbers or significance assessments were assigned. No further work was recommended.
Rosendahl 1989	Interim Report	Identified two historic properties, neither of which are located within 0.5 miles of the current project area.
Rosendahl 1989	Archaeological Inventory Survey	No historic properties identified.
Walker et al. 1991	Archaeological Inventory Survey	Identified 10 historic properties, none of which are located within 0.5 miles of the current project area.
Kikuchi and Remoaldo 1992	Cemetery Study	Documented one previously identified historic property located within 0.5 miles of the current project area: SHIP 50-30-11-B006, the Puhi Camp Cemetery.
Henry et al. 1993	Archaeological Inventory Survey	Identified two historic properties, neither of which are located within 0.5 miles of the current project area.
Hammatt and Chiogioji 1998	Archaeological Assessment	Identified four historic properties: Grove Farm office building in Puhi, Līhuʻe Mill Bridge, Hoʻomana Overpass Bridge, and Līhuʻe Public Cemetery (no SIHP numbers assigned).
Hammatt and Shideler 2004	Archaeological Inventory Survey and Cultural Impact Assessment	No historic properties identified.
Monahan and Powell 2005	Archaeological Monitoring	Identified 10 historic properties, two of which were traditional Native Hawaiian burials (SIHP 50-30-05-03880 and 50-30-05-03881) that were relocated to the Hawaiian Cemetery on Akialoa Road. No historic properties were identified within 0.5 miles of the current project area.
Hunkin et al. 2014	Archaeological Inventory Survey	Documented one newly identified historic property (SIHP 50-30-11-02220), and one previously identified historic property (SIHP 50-30-11-02179). One historic property was identified within 0.5 miles of the current project area: SIHP -02179, four water control features (Features A through D) associated with Lihue Plantation. Feature A is a reservoir, Feature B is a drainage ditch, Features C and D are irrigation ditches. The site was assessed as significant under Criterion d and archaeological monitoring was recommended for any future work.
McMahon and Tolleson 2015	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.

Reference	Type of Study	Findings
Kamai et al. 2016	Archaeological Inventory Survey	Identified one new historic property (SIHP 50-30-11-02307) and documented three previously identified historic properties (SIHP -B006, -02179, and -02220). Three historic properties were within 0.5 miles of the project area: Puhi Camp Cemetery (SIHP -B006), Lihue Plantation irrigation features (SIHP -02179), and a subsurface trash deposit associated with the former Puhi Camp (SIHP -02307). All three were assessed as significant under Criterion d, with SIHP -B006 also assessed as significant under Criterion e. No further work was recommended for SIHP -02179 and SIHP -02307, while preservation through avoidance and protection was recommended for SIHP -B006.
Folk et al. 2021	Archaeological Monitoring	No historic properties identified.

Note: Previous studies that include the current project area are highlighted in gray.

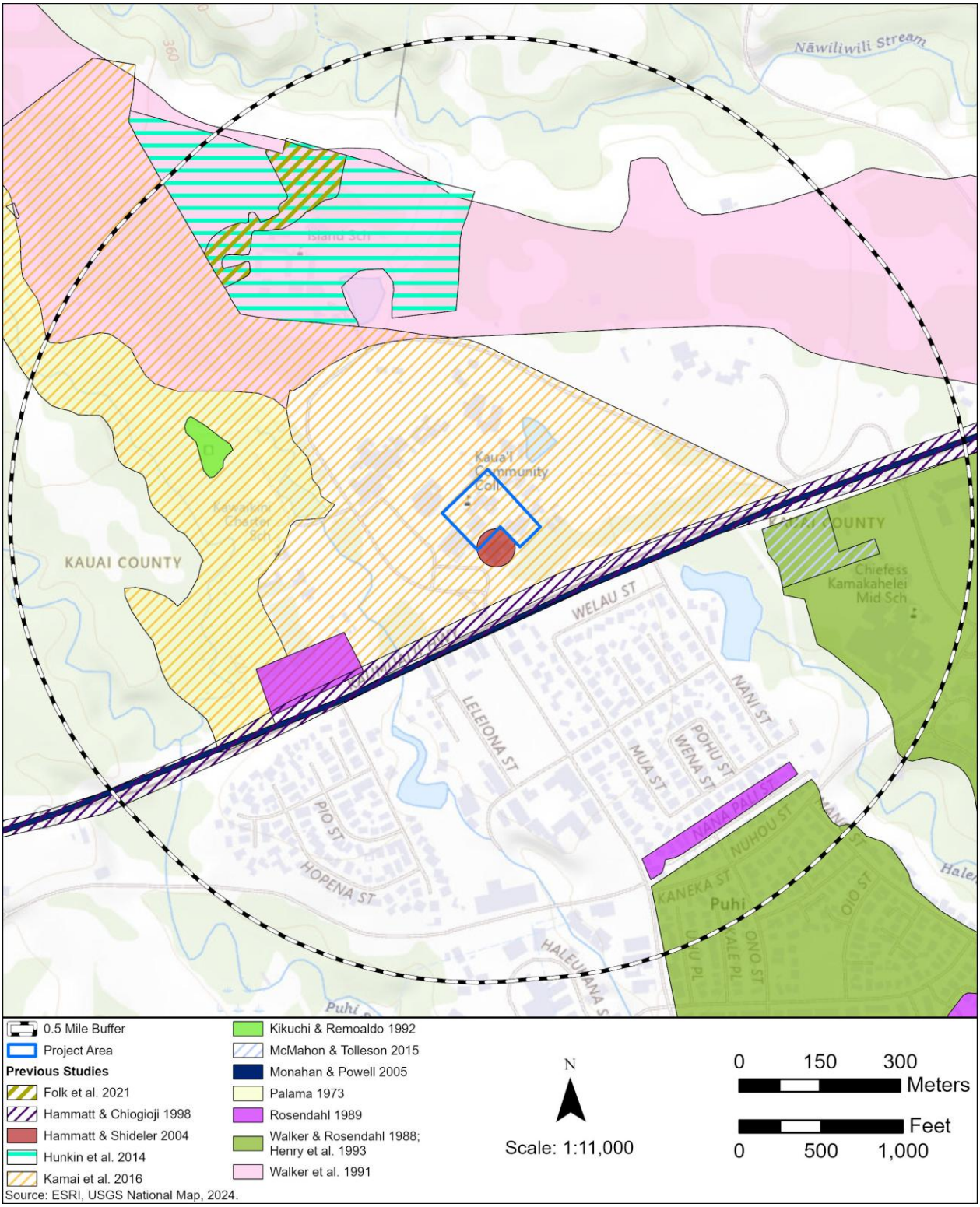


Figure 27. Previous archaeological studies conducted within 0.5 miles of the Kaua'i Community College portion of the HIFL project area.

Table 3. Previously Identified Historic Properties Within 0.5 Miles of the Nukoli'i Beach Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-30-08-00103	Dune burials	Burial	Pre-Contact	-	d, e	-	Reinterred in burial preserve at Wailua Golf Course	Bennett 1931; Fager and Spear 2000
50-30-08-00885	Irrigation ditch	Agricultural	Post-Contact	-	d	-	No Further Work	Dega and Powell 2003
50-30-08-01838	Cultural deposit (2) and reinterment area	Habitation; Burial	Pre-Contact	A, C*	a, d	-	FDC, PAI* (Walker); PAI (Corbin)	Walker et al. 1991; Corbin et al. 2002; On File, SHPD
50-30-08-01846	Concrete bridge	Transportation	Post-Contact	-	a, d	-	FDC (Walker); PAI (Corbin)	Walker et al. 1991; Corbin et al. 2002
50-30-08-02235	Canal	Water control	Post-Contact	-	d	-	No Further Work	Soltz et al. 2014

Note: historic properties located within the current project area are denoted by a gray highlight.

* Rather than using Hawai'i Register of Historic Places significance criteria, PHRI assigned their own significance categories, which are defined as follows:
A=Important for information content, further data collection necessary (PHRI=research value);
X=Important information content, no further data collection necessary (PHRI=research value, DLNR-HPP=not significant);
B=Excellent example of site type at local, region, island, State, or National level (PHRI=interpretive value); and
C=Culturally significant (PHRI=cultural value).

†PHRI also defined their own recommendations:
FDC=Further data collection necessary (further survey and testing, and possibly subsequent data recovery/mitigation excavations);
NFW=No further work of any kind necessary, sufficient data collected, archaeological clearance recommended, no preservation potential;
PID=Preservation with some level of interpretive development recommended (including appropriate related data recovery work; and
PAI=Preservation "as is,"
* Provisional recommendation pending results of further data collection.

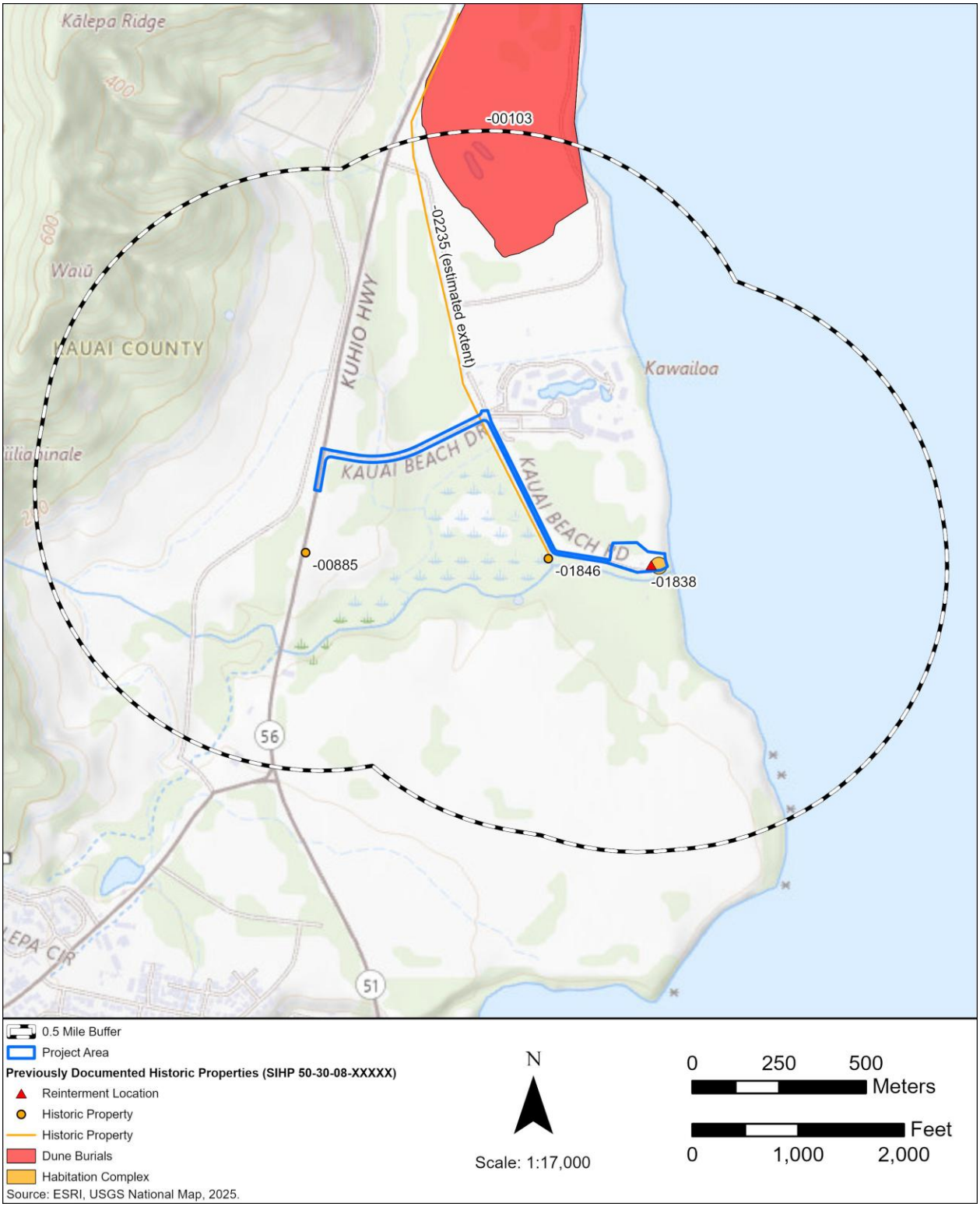


Figure 28. Previously identified historic properties within 0.5 miles of the Nukoli'i Beach portion of the HIFL project area.

Table 4. Previously Identified Historic Properties Within 0.5 Miles of the Kauaʻi Community College Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-30-11-02179	Lihue Plantation infrastructure	Agricultural	Post-Contact	-	d	-	Archaeological Monitoring (Features A-D) (Hunkin et al. 2014, Folk et al. 2021); No Further Work (Kamai et al. 2016)	Palama 1973; Hunkin et al. 2014; Kamai et al. 2016; Folk et al. 2021)
50-30-11-02307	Subsurface trash pit	Refuse disposal	Post-Contact	-	d	-	No Further Work	Kamai et al. 2016
50-30-11-09339	Kilohana (Gaylord P. Wilcox House)	Habitation	Post-Contact	-	c	-	Preservation	Morrison 1993 (NRHP Nomination Form)
50-30-11-09381	Grove Farm Company Locomotives	Transportation, Industry	Post-Contact	-	-	-	Preservation	Schleck and Napoka 1979 (NRHP Nomination Form)
50-30-11-B006	Puhi Camp Cemetery	Burial	Post-Contact	-	d, e	-	No further work (Palama 1973); Preservation through avoidance and protection (Kamai et al. 2016)	Palama 1973; Kikuchi and Remoaldo 1992; Kamai et al. 2016
No SIHP	Grove Farm office building	Industry	Post-Contact	-	-	-	None provided	Hammatt and Chiogioji 1998

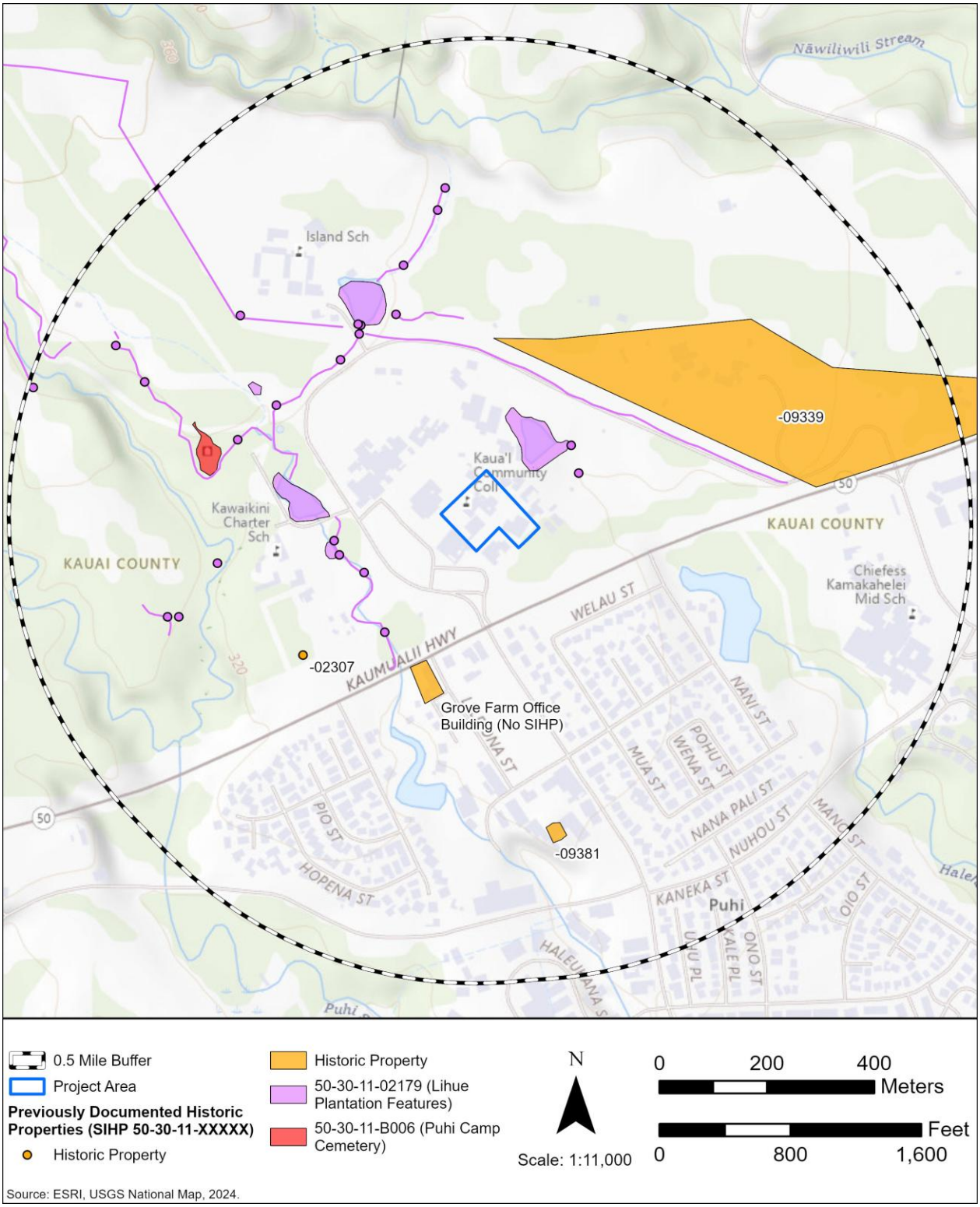


Figure 29. Previously identified historic properties within 0.5 miles of the Kauaʻi Community College portion of the HIFL project area.

2.2 O‘AHU CABLE LANDING SITE

2.2.1 Archival Research Summary

The O‘ahu portion of the HIFL project area is located in a coastal portion of Honouliuli Ahupua‘a within the *moku* of ‘Ewa, at Barbers Point Beach Park. The area around Barbers Point Beach Park, traditionally known as Kalaeloa, lies within the uplifted coral reef of the ‘Ewa Plain, characterized by abundant limestone pit features (Figure 30, Figure 31). These limestone pits are known to have been used for agricultural activities, and have also been found to house paleontological remains, cultural midden deposits, as well as burials in some instances. Paleoenvironmental data recovered from limestone pits and sediment cores recovered from Ordy Pond (located in Kalaeloa approximately 3.5 miles east of the project area) have provided important data for understanding past landscapes and environmental transformations shortly after people first arrived on O‘ahu. This includes avifaunal and terrestrial mollusk remains, including some now-extinct or extirpated species, and transitions from native forest cover to open canopy. While *kalo* (taro; *Colocasia esculenta*) was grown in abundance in the lowlands of Pu‘uloa (known today as Pearl Harbor, the West Loch of which is approximately 6.8 miles northeast of the project area), the drier interior of Honouliuli was referred to as “sweet potato land”, with mid-nineteenth-century descriptions of planting in hollows of rocks and near the brackish water ponds scattered throughout this landscape.

During the Mahele, Honouliuli Ahupua‘a was awarded to Miriam Ke‘ahikuni Kekau‘ōnohi, granddaughter of Kamehameha I. Most of the LCAs awarded were located near Honouliuli Stream in the Pu‘uloa/West Loch area. Archival research did not identify any LCAs in the vicinity of the O‘ahu portion of the HIFL project area.

The post-Contact name Barbers Point, as well as the lighthouse that was eventually built there, both trace their origins to Captain Henry Barber’s ship, the *Arthur*, which ran aground at Kalaeloa in 1796. After ships continued to run aground in this area, a lighthouse was built in the 1880s. Other post-Contact land use in the area was largely focused on commercial ranching and agriculture. Honouliuli Ranch, established by James Campbell in 1881, occupied approximately 41,000 acres. Some of these lands were subsequently devoted to other ventures including rice, sugarcane, and sisal agriculture, bee-keeping, fishing, and limestone quarrying. By the early 1900s, *kiawe* forests stretched along a large portion of O‘ahu’s southwestern coast. In 1890, the Ewa Plantation Company was established and became one of the largest and most prosperous sugarcane operations in Hawai‘i (see Figure 31). On November 16, 1889, the Oahu Railway and Land Company (OR&L) Railroad began operations, and subsequently experienced a surge in popularity during WWII. Land use in Honouliuli shifted considerably during the war, as Pu‘uloa and the adjacent ‘Ewa Plain became a key site of military development. Beginning in the 1960s through the current day, the land around Barbers Point was increasingly developed for industrial and commercial use, becoming known as Campbell Industrial Park.

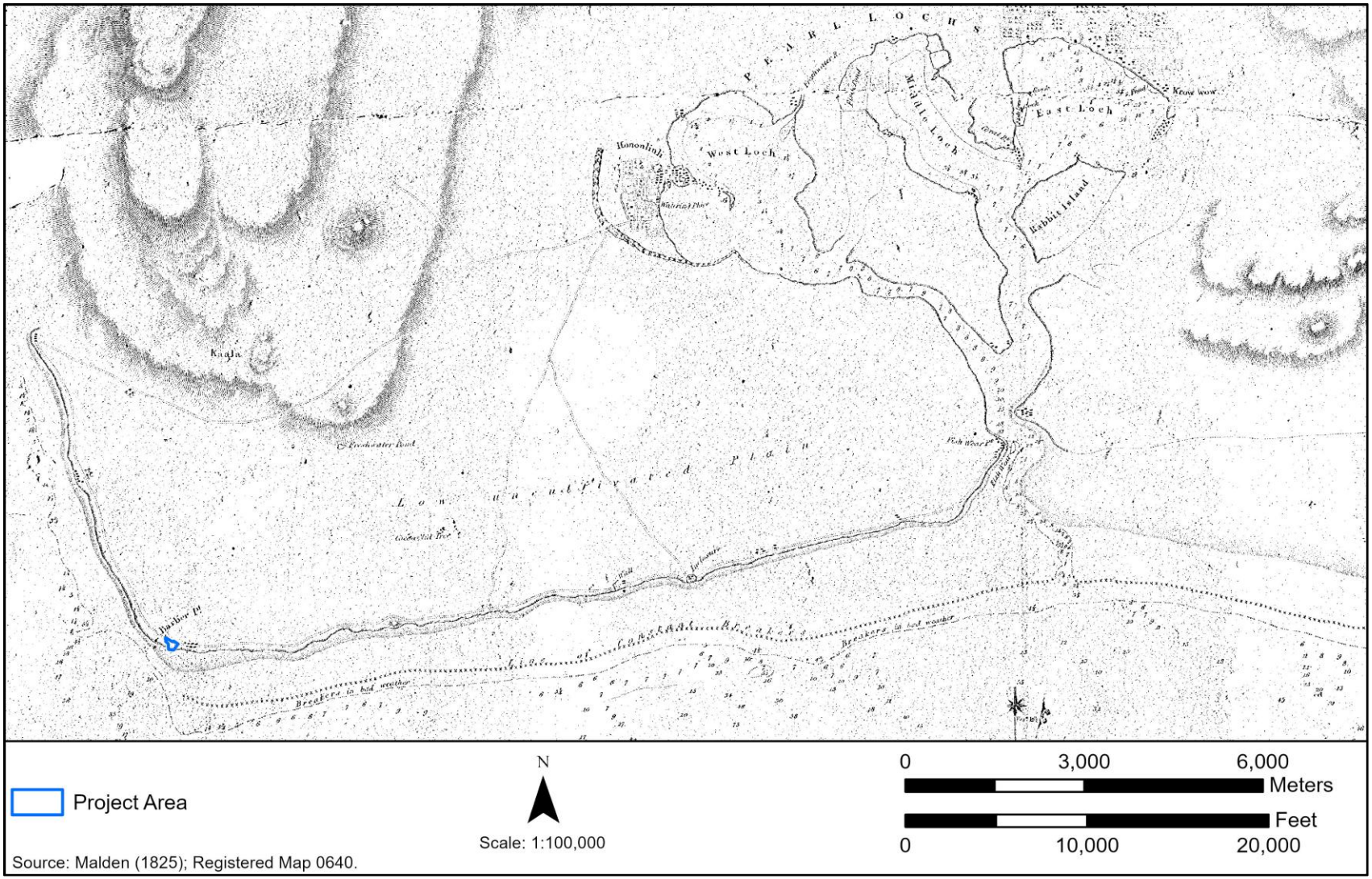


Figure 30. An 1825 map by Lieutenant C. Malden shows the Oʻahu portion of the HIFL project area located in the "uncultivated plain" of ʻEwa, with early post-Contact trails traversing the coastline and extending *mauka-makai*.

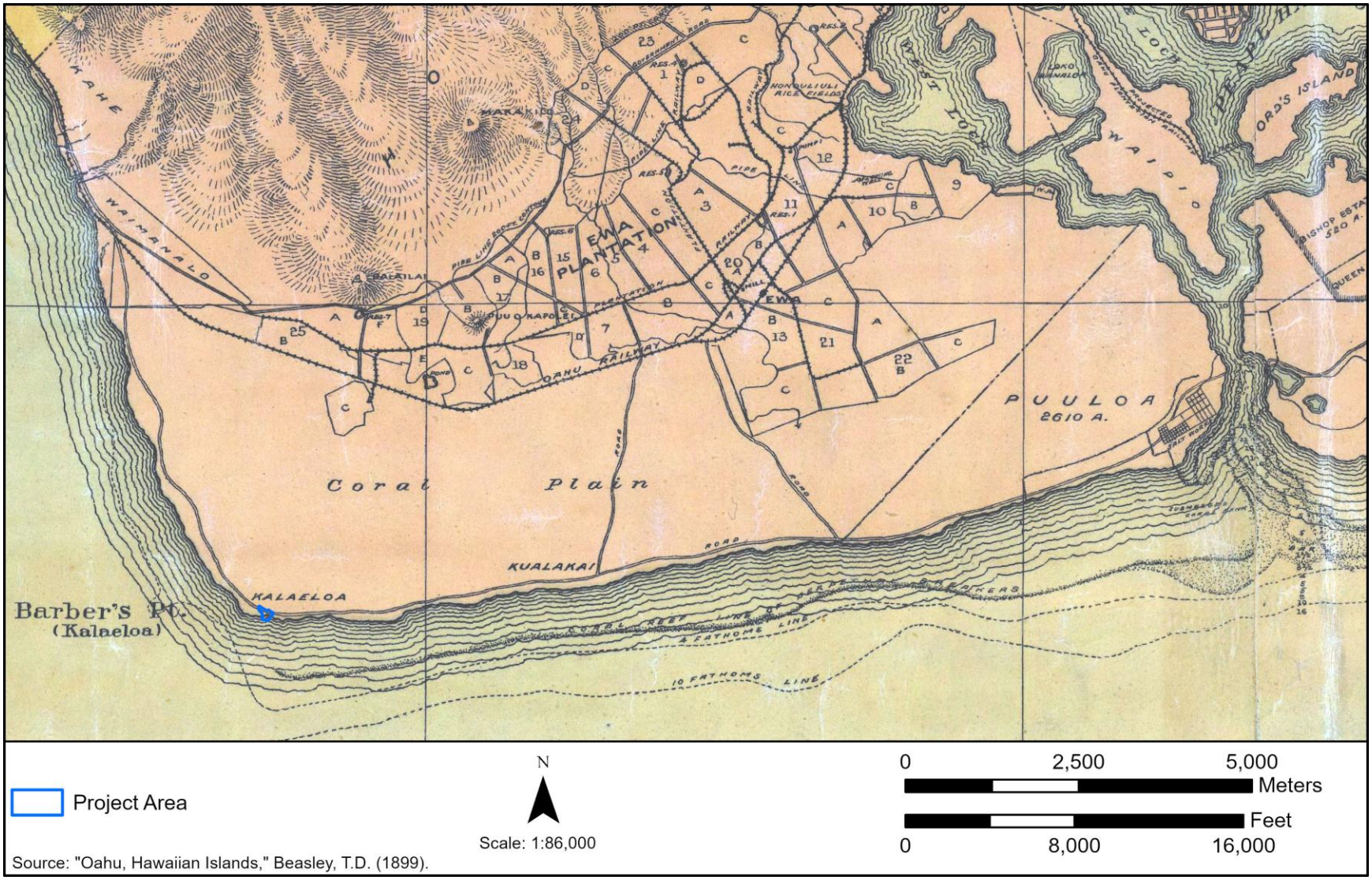


Figure 31. An 1899 map by T.D. Beardsley showing the Oʻahu portion of the HIFL project area located in the area labeled "Coral Plain" with the trails depicted in Figure 29 now indicated as developed roads.

2.2.2 Previous Archaeology

A total of 16 archaeological studies have been conducted within a 0.5-mile (0.8-km) buffer around the Oʻahu portion of the HIFL project area at Barbers Point Beach Park. Table 5 provides an overview of all 16 archaeological investigations with a summary of their findings. A total of 10 historic properties have been identified within the 0.5-mile buffer. All 10 previously identified historic properties are described in Table 6, which also contains significance assessments and mitigation recommendations. These historic properties are shown in Figure 33.

Although no historic properties had been previously identified within the current project area, nearby sites reflect a mix of pre- and post-Contact activities in the Barbers Point area. The surrounding area is relatively flat, dotted with numerous limestone *kālua* (pit caves). Previous archaeological investigations (Davis 1988, Davis 1989, Davis 1990, Medina and Hammatt 2015, Belluomini et al. 2017, Spangler et al. 2020) have revealed extensive complexes of pit caves that included pre-Contact Native Hawaiian archaeological deposits and burials.

Previously identified post-Contact historic properties include features associated with the commercial sugarcane industry, maritime history, and coastal navigation and defense. These included irrigation ditches, military complexes related to the Barbers Point Military Reservation, the Barbers Point Lighthouse, and two documented shipwrecks, the *Arthur* (1796) and *Liliu* (1877).

Table 5. Previous Archaeological Studies within 0.5 Miles of the Oʻahu Portion of the HIFL Project Area

Reference	Type of Study	Findings
Clark 1979	Archaeological Reconnaissance	No historic properties identified.
Ahlo and Hommon 1983	Archaeological Reconnaissance	Identified eight potential historic properties consisting of pits and possible deposits. No historic properties identified within 0.5 miles of the current project area.
Hommon and Ahlo 1984	Test Excavations	Conducted testing at six historic properties previously identified by Ahlo and Hommon (1983). All are located more than 0.5 miles from the current project area.
Davis 1988	Archaeological Reconnaissance	Identified at least 15 limestone pits with data recovery potential including one within 0.5 miles of the project area: SIHP 50-80-12-04099. No significance assessments were made.
Davis 1989	Archaeological Investigation	Determined that four limestone pits previously identified by Davis (1988) had been destroyed by bulldozing activities.
Carlson and Rosendahl 1990	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Davis 1990	Archaeological Inventory Survey	Excavated four of 13 limestone pits previously documented by Davis (1988). Identified a human burial at SIHP 50-80-12-04099 within 0.5 miles of the project area. No assessment of significance or recommendations were made at that time.
Schilz and Landrum 1996	Test Excavation	No historic properties identified.
McCoy and Clark 2008	Archaeological and Cultural Impact Assessment	No historic properties identified.
Groza and Hammatt 2010	Archaeological Monitoring	No historic properties identified.

Reference	Type of Study	Findings
Condit and Allen 2011	Archaeological Monitoring	No historic properties identified.
Runyon et al. 2012	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Medina and Hammatt 2015	Archaeological Monitoring	Identified one historic property, SIHP 50-80-12-07402, a pre-Contact cultural deposit, within 0.5 miles of the project area. SIHP -07402 was assessed as significant under Criterion d and archaeological monitoring was recommended for any future ground disturbing activities.
Belluomini et al. 2017	Archaeological Inventory Survey	Two historic properties identified: SIHP 50-80-12-06866 (military complex), assessed as significant under Criteria a and d; no further work was recommended for the northern mount and concrete slab, but the central mount was to be preserved; SHIP 50-80-12-07835 (limestone pit complex) assessed as significant under Criteria d and e; 50 of the 68 pit caves were recommended for preservation and six were infilled for future investigation.
Fechner and Cleghorn 2017	Archaeological Monitoring	No historic properties identified.
Spangler et al. 2020	Archaeological Monitoring	Two historic properties identified within 0.5 miles of the current project area (SIHP 50-80-12-06866 and 50-80-12-07835). One feature (WWII-era gun emplacement) was added to SIHP -06866 and subsequently demolished. SIHP -06866 was assessed as significant under Criteria a and d, while SHIP -07835 was assessed as significant under Criteria d and e. The study recommended preservation for the extant features of SIHP -07835 and that SHPD be consulted for any future ground disturbing activities that may impact either site.

Note: Previous studies that include the current project area are highlighted in gray.

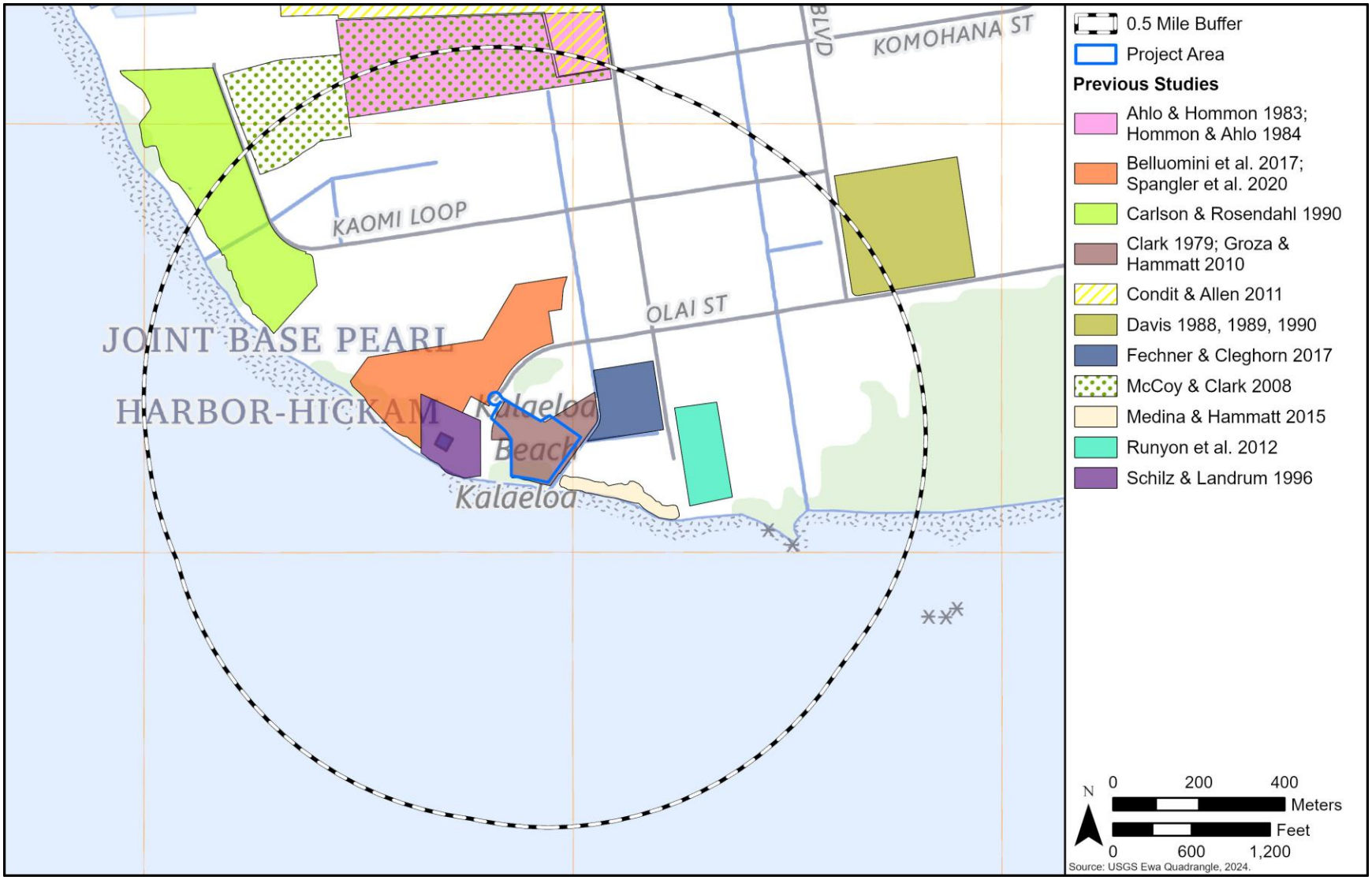


Figure 32. Previous archaeological studies conducted within 0.5 miles of the Oʻahu portion of the HIFL project area.

Table 6. Previously Identified Historic Properties Within 0.5 Miles of the Oʻahu Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance (HAR)	Mitigation Recommendation	Reference(s)
50-80-12-04099	Limestone pit complex, burial	Paleoenvironmental data, burial	Pre-Contact	d	No Further Work	Davis 1988, 1989, 1990
50-80-12-06866	Complex (gun emplacement and concrete slab)	Coastal defense	Post-Contact	a, d	Preservation	Belluomini et al. 2017; Spangler et al. 2020
50-80-12-06950	Irrigation ditch	Agriculture - intense mechanized	Post-Contact	d	None provided	On File, SHPD
50-80-12-06951	Irrigation ditch	Agriculture - intense mechanized	Post-Contact	d	None provided	On File, SHPD
50-80-12-07402	Cultural deposit	Temporary habitation	Pre-Contact	d	Archaeological Monitoring	Medina and Hammatt 2015
50-80-12-07835	Pit cave complex	Potential activity area	Unknown	d, e	Preservation, Archaeological Monitoring	Belluomini et al. 2017; Spangler et al. 2020
50-80-12-08938	Burial	Burial	Pre-Contact	-	None provided	On File, SHPD
No SIHP	Barbers Point Lighthouse	Communication	Post-Contact	-	None provided	NRHP 2024
SCR No. 850	“Arthur”	British brig (Captain Barber) reported lost 1796 near Barber’s Point	Post-Contact	-	None provided	BOEM 2017
SCR No. 404	“Liliu”	Schooner lost in 1877	Post-Contact	-	None provided	BOEM 2017

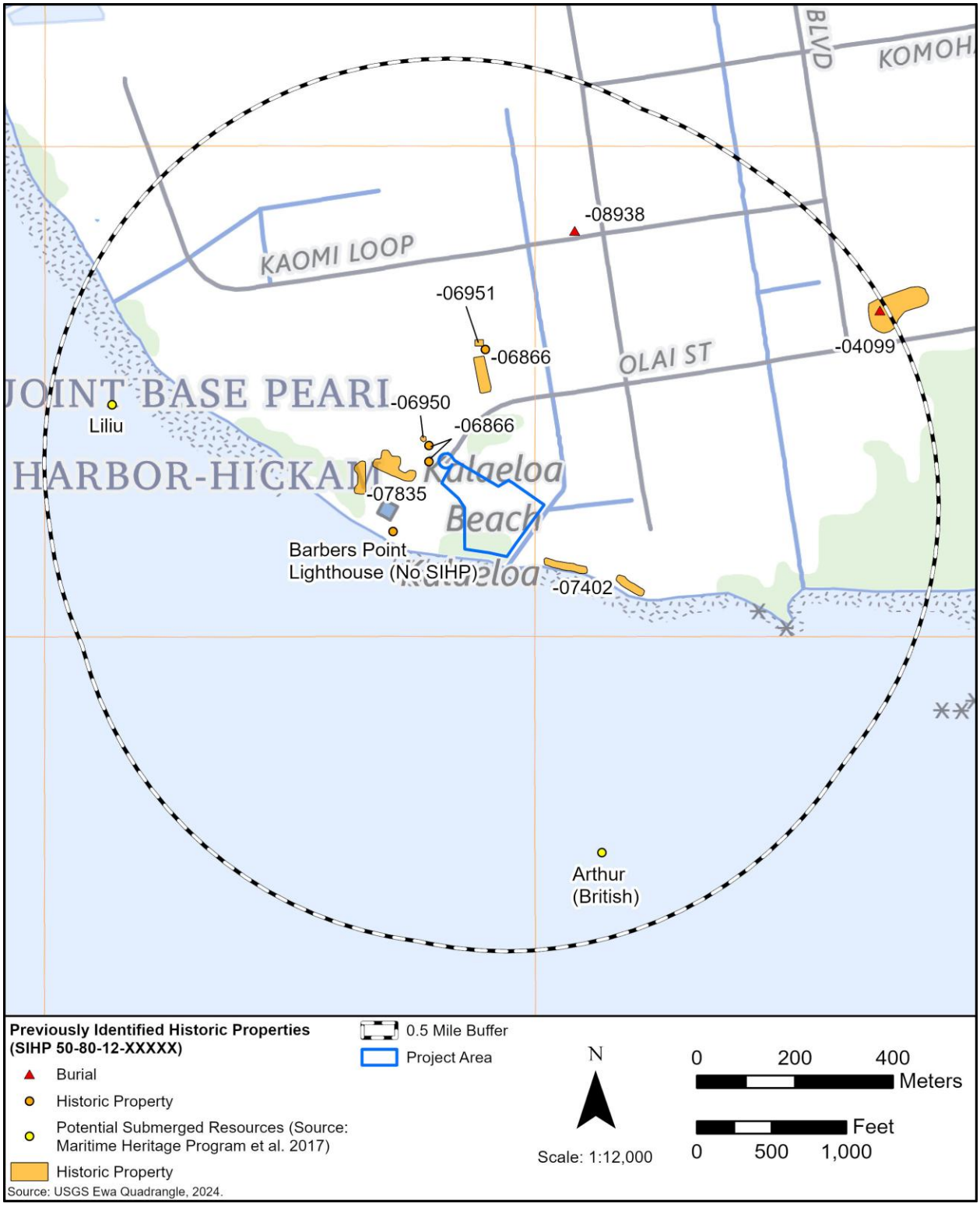


Figure 33. Previously identified historic properties within 0.5 miles of the Oʻahu portion of the HIFL project area.

2.3 MAUI CABLE LANDING SITE

2.3.1 Archival Research Summary

The Maui portions of the HIFL project area are located within the traditional *moku* of Wailuku, and the *ahupuaʻa* of the same name. Wailuku Ahupuaʻa is a vast and much-storied region. Wailuku is one of the "Four Waters of Maui," or *Na Wai Ehā*, along with Waikapu, Waiehu, and Waiheʻe, all of which were later grouped into a single district known as Na Poko (Figure 34). The meaning of the name Wailuku, often translated to "water [of] destruction," has been attributed to a late eighteenth century battle between Kalaniʻōpuʻu, *mōʻī* (sovereign) of Hawaiʻi Island, and Kahekili, *mōʻī* of Maui, known as "*Ahulau ka Piʻipiʻi i Kakanilua*," or "Slaughter of the Piʻipiʻi at Kakanilua." An alternate explanation attributes the name to the 1790 Battle of ʻĪao, also known as the "Battle of Kepaniwai," or "the damming of the waters."

There are many *moʻolelo* (oral traditions) that relate to Wailuku, including significant places in and around the project area. This includes the broader Na Wai Ehā region, Kanahā and Mauʻoni ponds, the plains of Kamaʻomaʻo, and the Pihana Heiau complex. Some of the *ʻōlelo noʻeau* that refer to Wailuku speak to the battles that occurred there. Those that refer to Kahului mention the "swaying sea," the construction of the twin ponds Mauʻoni and Kanahā, and the momentous arrival of carrier pigeons to Kahului in 1893.

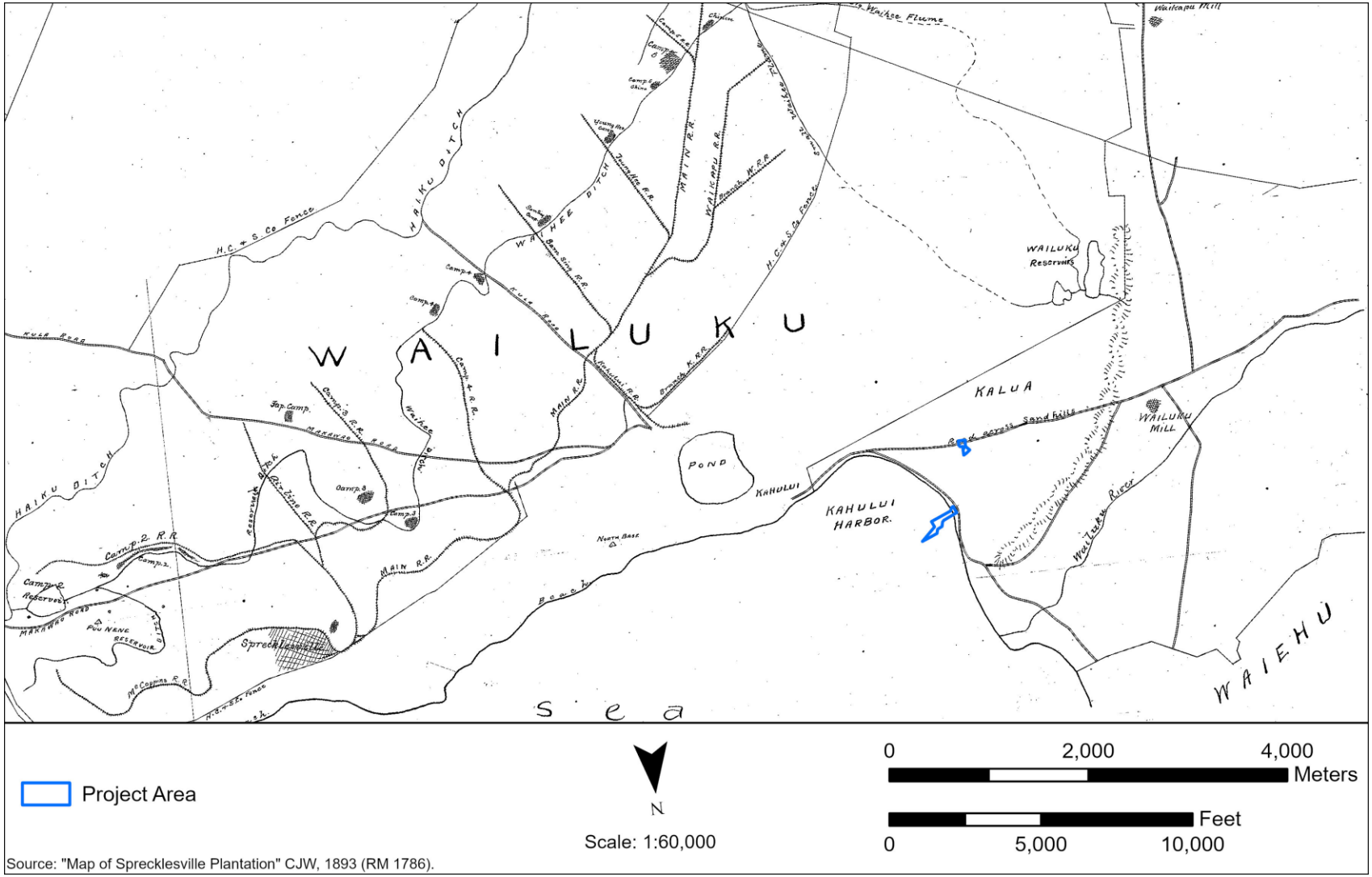
Before the introduction of commercial sugarcane agriculture radically transformed the landscape around Kahului, sweet potato plantations and fishing settlements lined the north coast of Maui, while irrigated *kalo* agriculture was practiced on the plains around the Wailuku River. The project area lies within the Pleistocene aeolian sand dunes that characterize most of the isthmus between East and West Maui. Marine resources were abundant around Kahului Harbor, and a wide variety of fishing techniques were practiced. This included bag net fishing, which was a method well-suited to sandy areas like Kahului and Hilo Bay. Kahului continued to serve as a primary fishery with abundant marine resources into the post-Contact period.

During the Mahele, Wailuku Ahupuaʻa was designated as Crown Land. On the passing of Lot Kapuāiwa (Kamehameha V), the *ahupuaʻa* passed to his half-sister, Ruth Keʻelikolani. In 1882, Keʻelikolani sold a portion of these lands to Claus Spreckels, who continued to consolidate his landholdings in Wailuku for commercial sugarcane production. A number of LCAs were awarded in Wailuku, though most are located in the flood plains of ʻĪao Valley, far from the project area. A smaller number are clustered closer to the shore, just north of the project area (Figure 35). Many of the LCAs near the project area were awarded as land deeds by Kamehameha IV. A portion of the project area lies within LCA 420, awarded to H. Kuihelani.

Commercial sugarcane agriculture began in Wailuku on a small scale in the early 1800s, with a small number of mills and plantations. In the mid-1860s, disruptions to sugar supply from the American South brought new demand for sugar from Hawaiʻi. The proliferation of sugar plantations across Maui expanded further in 1876, when the Reciprocity Treaty eliminated the 40% tariff on sugar entering the U.S. from Hawaiʻi. Much of the infrastructural development in Wailuku through the nineteenth and early twentieth centuries was inextricably tied to the growth of commercial sugarcane agriculture. This included large-scale irrigation infrastructure which diverted water into sugarcane fields, the Kahului Railroad, Kahului Harbor, and much of the early development of Kahului Town.

Several large-scale disasters impacted Kahului in the 1900s. When an outbreak of the plague struck Kahului at the turn of the century, a portion of the town was burned to the ground and a quarantine was instated for several years. Kahului Harbor became a key location for Naval operations and military supply routes during WWII. At the end of 1941, at least 10 high-explosive shells were fired at Kahului from what was believed to be an enemy submarine. The 1946 tidal wave caused damage to much of the area around Kahului Harbor, including the military infrastructure established during WWII, and the Kahului Railroad Company's general office, which contained many of the archival records that detailed Kahului's early development.

Maui Vocational School was built in 1931 and began as a single-story building with an automobile shop, carpentry shop, machine shop, electrical shop, classroom, and offices. The Hawaiian Commercial and Sugar Company later donated 11.5 acres of land for the school to expand, adding more shops and programs, as well as additional space for classrooms and administration. In 1958, Maui Vocational School was renamed to Maui Technical School. In 1965, it entered the University of Hawai'i Community College system and was renamed to Maui Community College. In 2010, the school was renamed to UH Maui College.



Source: "Map of Specklesville Plantation" CJW, 1893 (RM 1786).

Figure 34. An 1893 map of the Spreckelsville Plantation. The "road across sand hills" runs through the northernmost portion of the Maui portions of the HIFL project area.

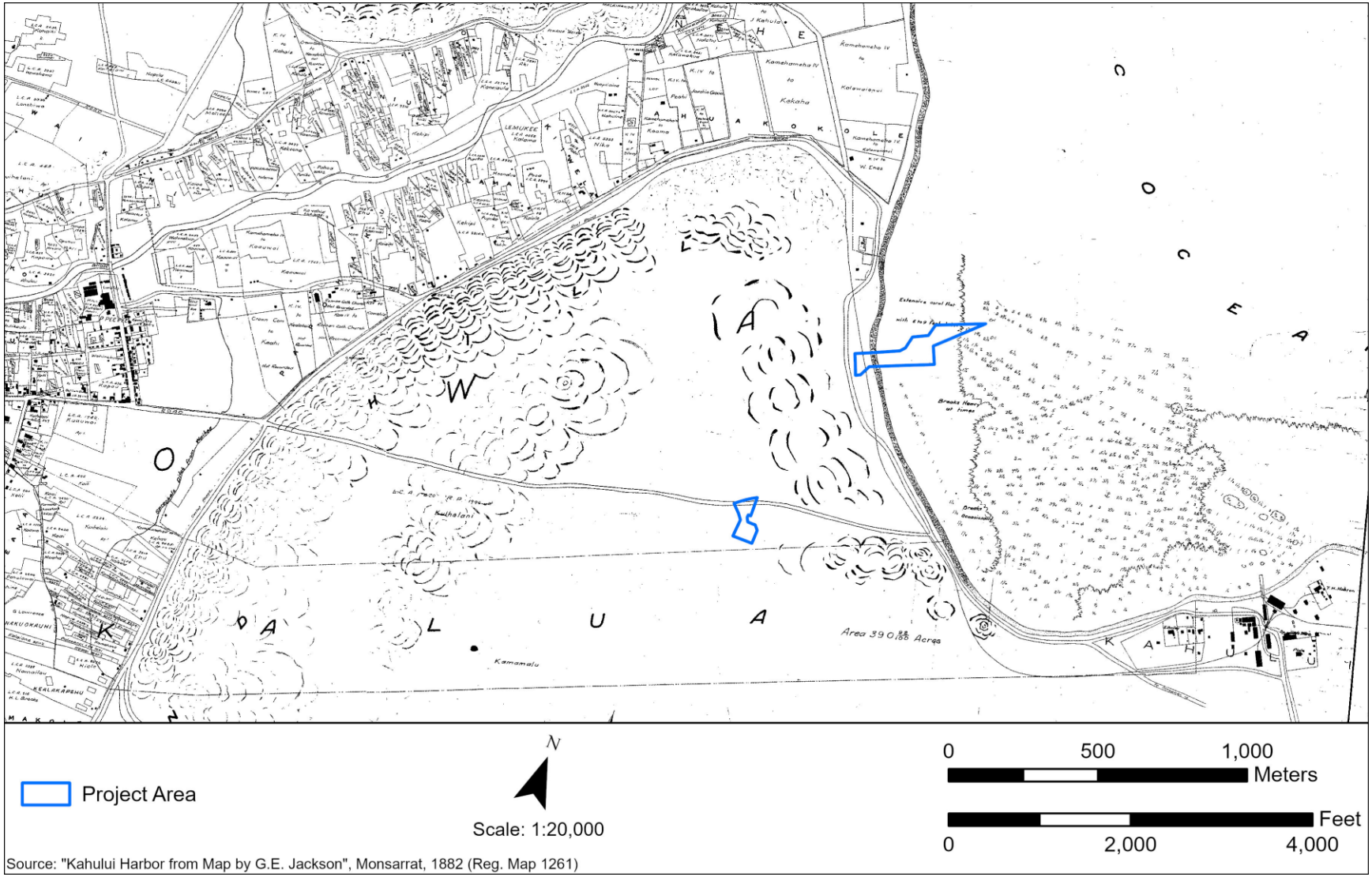


Figure 35. An 1882 map by Monsarrat showing LCAs primarily located to the northwest of the Maui portions of the HIFL project area. A portion of the project area lies within LCA 420 (not shown), awarded to Kuihelani.

2.3.2 Previous Archaeology

A total of 34 archaeological studies have been conducted within a 0.5-mile (0.8-km) buffer around the Maui portions of the HIFL project area (Figure 36). Table 7 provides an overview of all 34 archaeological investigations with a summary of their findings. A total of 32 historic properties have been identified within this 0.5-mile buffer. All previously identified historic properties are shown in Figure 37 and described in Table 8, which also contains significance assessments and mitigation recommendations.

Nearby historic properties reflect both pre- and post-Contact activities in Kahului. The Maui portions of the project area are situated largely on Puuone sands, and a number of burials in the vicinity reflect the traditional use of coastal sand dunes as a burial area. Other pre-Contact historic properties in the area include subsurface cultural deposits and habitation complexes. All burials and historic properties associated with the pre-Contact period are located to the north and west of the Maui portions of the HIFL project area. The location of Malaihakoa Heiau (SIHP 50-50-04-00055; Walker 1931 Site 55) near UH Maui College in Figure 37 is on file with SHPD and was obtained through HICRIS. However, Walker (1931; see Sterling 1998:64)reported this *heiau* as having been destroyed, and located at Paukukalo, which is along the coast to the northeast of the project area.

Post-Contact historic properties include features associated with commercial sugarcane agriculture and related infrastructure, the development of Kahului Town, and the impacts of WWII. This includes portions of the Kahului Railroad Berm, commercial and residential structures, recreational and educational facilities, and WWII infrastructure. A portion of the project area lies within the Kahului Harbor Historic District (SIHP 50-50-04-02953), which was added to the State Register of Historic Places in 1974 during the statewide inventory. According to the nomination, "Kahului Harbor consists of the piers, wharves, breakwaters, and associated structures that make up the active harbor facility. It is significant for its role in the development of the town of Kahului from 1901 to 1931" (on file, SHPD). SIHP 50-50-04-04232, a series of WWII-era Quonset huts associated with the 18th Service Battalion Camp, was identified northeast of the portion of the project area at UH Maui College and directly southwest (inland) of the project area at Kahului Harbor. Following the war, the Quonset huts were repurposed into commercial office and storage space until they were dismantled in the 1980s. The remaining concrete pads were destroyed, reburied, or incorporated into the design of Maui Central Park (Heidel et al. 1997).

Table 7. Previous Archaeological Studies Within 0.5 Miles of the Maui Portions of the HIFL Project Area

Reference	Type of Study	Findings
Walker 1931	Island-wide Survey	Identified Site 55, Malaihakoa Heiau (later designated as 50-50-04-00055), possibly within 0.5 miles of the current project area.
Kennedy 1988a	Archaeological Reconnaissance	No historic properties identified.
Kennedy 1990	Archaeological Testing	No historic properties identified.

Reference	Type of Study	Findings
Fredericksen and Fredericksen 1992a	Archaeological Inventory Survey	Identified two historic properties, both of which are located within 0.5 miles of the current project area: SIHP 50-50-04-03112, the Kahului Railroad complex, and 50-50-04-03135, remnants of the Makaweli Rock Crusher Mill. SIHP -03112 was assessed as significant under Criterion d. No significance assessment was made for SIHP -03135. Developers stated that portions of SIHP -03135 (concrete pillars) were going to be preserved, but the concrete chute *mauka* would be removed along with the railroad berm. Archaeological monitoring was recommended for both sites.
Fredericksen and Fredericksen 1992b	Archaeological Inventory Survey	Identified two historic properties: SIHP 50-50-04-03119, refuse area, and SIHP 50-50-04-03120, a subsurface cultural deposit, and documented one previously identified historic property: SIHP -03112, portions of the Kahului Railroad. All three historic properties are located within 0.5 miles of the current project area. Test excavation of SIHP -03120 identified a single human bone. SIHP -03119, SIHP -03120, and the previously identified SIHP -03112 were assessed as significant under Criterion d. The report recommended data recovery and removal for SIHP -03112, additional research and testing of SIHP -03119 and -03120, and archaeological monitoring of all earth moving activities.
Fredericksen and Fredericksen 1992c	Archaeological Inventory Survey	No historic properties identified.
Kennedy et al. 1993	Archaeological Inventory Survey	No historic properties identified.
Fredericksen et al. 1994	Archaeological Inventory Survey	No historic properties identified.
Fredericksen and Fredericksen 1995	Archaeological Inventory Survey	No historic properties identified.
Heidel et al. 1996	Archaeological Reconnaissance with Subsurface Testing	No historic properties identified.
Fredericksen 1997	Archaeological Monitoring	No historic properties identified.
Heidel et al. 1997	Archaeological Inventory Survey	Three historic properties were identified, all of which are located within 0.5 miles of the current project area, including one newly identified historic property: SIHP 50-50-04-04211; scattered human remains, and two previously identified historic properties: SIHP 50-50-04-04232, WWII military installation; and SIHP -03112, the Kahului Railroad berm. SIHP -04232 was assessed as significant under Criteria a and d, SIHP -03112 under Criterion a, and SIHP -04211 was determined no longer significant, as the iwi kupuna were relocated by SHPD. Archaeological monitoring was recommended for all construction activities.
Devereux and Hammatt 1998	Archaeological Monitoring	No historic properties identified.

Reference	Type of Study	Findings
Fredericksen et al. 1998	Data Recovery	Data recovery for three previously identified historic properties: SIHP -03112, -03119 (components A and B), and -03120. No significance assessments or recommendations were made.
Devereux and Hammatt 1999	Archaeological Monitoring	Identified four isolated burials: SIHP 50-50-04-04476 through 50-50-04-04479) and relocated one previously identified burial (50-50-04-04211), which was reinterred.
Rechtman 2000	Archaeological Monitoring	No historic properties identified.
Perzinski et al. 2001	Archaeological Monitoring	No historic properties identified.
Fredericksen and Fredericksen 2002	Archaeological Inventory Survey	Documented two newly identified historic properties during subsurface testing: SIHP 50-50-04-05212, a pre-Contact habitation site and 50-50-04-05213, a concrete foundation originally utilized by Maui Dry Goods & Grocery Co. Ltd. SIHP -05212 and -05213 were assessed as significant under Criterion d and recommended for preservation "as is." Archaeological monitoring was recommended for any ground disturbing activities.
Tome and Dega 2005	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Fredericksen 2005a	Archaeological Inventory Survey	Identified five historic properties: SIHP 50-50-04-05471, 50-50-04-05472, 50-50-04-05495, 50-50-04-05496 and 50-50-04-05660, all of which are located within 0.5 miles of the current project area. These include two possible Native Hawaiian burials (SIHP -05471 and -05472), three in situ burials and the previously disturbed remains of two individuals (SIHP -05495), a pre-Contact habitation area with an associated waterworn basalt pavement (SIHP -05496); and a pre-Contact habitation area remnant (SIHP -05660). SIHP -05660 and -05496 were assessed as significant under Criterion d. Due to its association with SIHP -05495, SIHP -05496 was also assessed as significant under Criterion e, along with SIHP -05471 and -05472. Archaeological monitoring and consultation with SHPD and the Maui/Lānaʻi Island Burial Council was recommended for future ground disturbing activities.
Fredericksen 2005b	Archaeological Monitoring	No historic properties identified.
Cordle and Dega 2007	Archaeological Monitoring	No historic properties identified.
Fredericksen 2007	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Kirkendall 2008	Archaeological Assessment	No historic properties identified.
Frey and Fredericksen 2009	Archaeological Monitoring	No historic properties identified.
Perzinski and Dega 2011	Archaeological Monitoring	No historic properties identified.
Hodara and Dega 2015a	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.

Reference	Type of Study	Findings
Hodara and Dega 2015b	Archaeological Monitoring	Identified two pre-Contact historic properties, both of which are located within 0.5 miles of the current project area. SIHP 50-50-04-07493 consists of three features: one burial and two cultural layers. SIHP 50-50-04-07494 is a multi-function site with 14 component features, including five burials, eight pit features, and a cultural layer. Both sites were assessed as significant under Criteria d and e. A Burial Treatment Plan was developed and recommended preservation of four of the burials *in situ* and disinterment and reinterment of the other two in their original location. Archaeological monitoring was recommended for any additional ground disturbing activities.
Baggs and Dega 2016	Archaeological Monitoring	No historic properties identified.
Royalty and Hammatt 2017	Archaeological Monitoring	Documented one newly identified historic property and four previously identified historic properties, two of which are within 0.5 miles of the current project area: 50-50-04-01607, Kahului Historic District; 50-50-04-01630, Henry Perrine Baldwin High School.
Fuentes et al. 2022	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
FAI Architects 2023a	Reconnaissance Level Survey	Identified one architectural historic property located within 0.5 miles of the current project area: SIHP 50-50-04-09016, Ichiro "Iron" Maehara Baseball Stadium. SIHP -09016 was assessed as significant under Criteria a and c and recommended for no further survey or architectural mitigation.
FAI Architects 2023b	Reconnaissance Level Survey	Completed architectural documentation of seven buildings, five sites, and one structure in the War Memorial Complex. Two architectural historic properties are located within 0.5 miles of the current project area: SIHP 50-50-04-09017,Coach Soichi Sakamoto Pool, and SIHP 50-50-04-09018,Thomas "Cheena" Lau Hee Little League Field and Toshio "Tata" Fujimoto Baseball Field, and the associated Little League Fields' Restroom. Both properties were assessed as significant under Criterion a, and SIHP -09017 was also assessed as significant under Criterion c. The study recommended no further survey or architectural mitigation at that time. However, HRS Chapter 6E review and consultation with SHPD were suggested for any futures projects in the area.

Note: Previous studies that include the current project area are highlighted in gray.

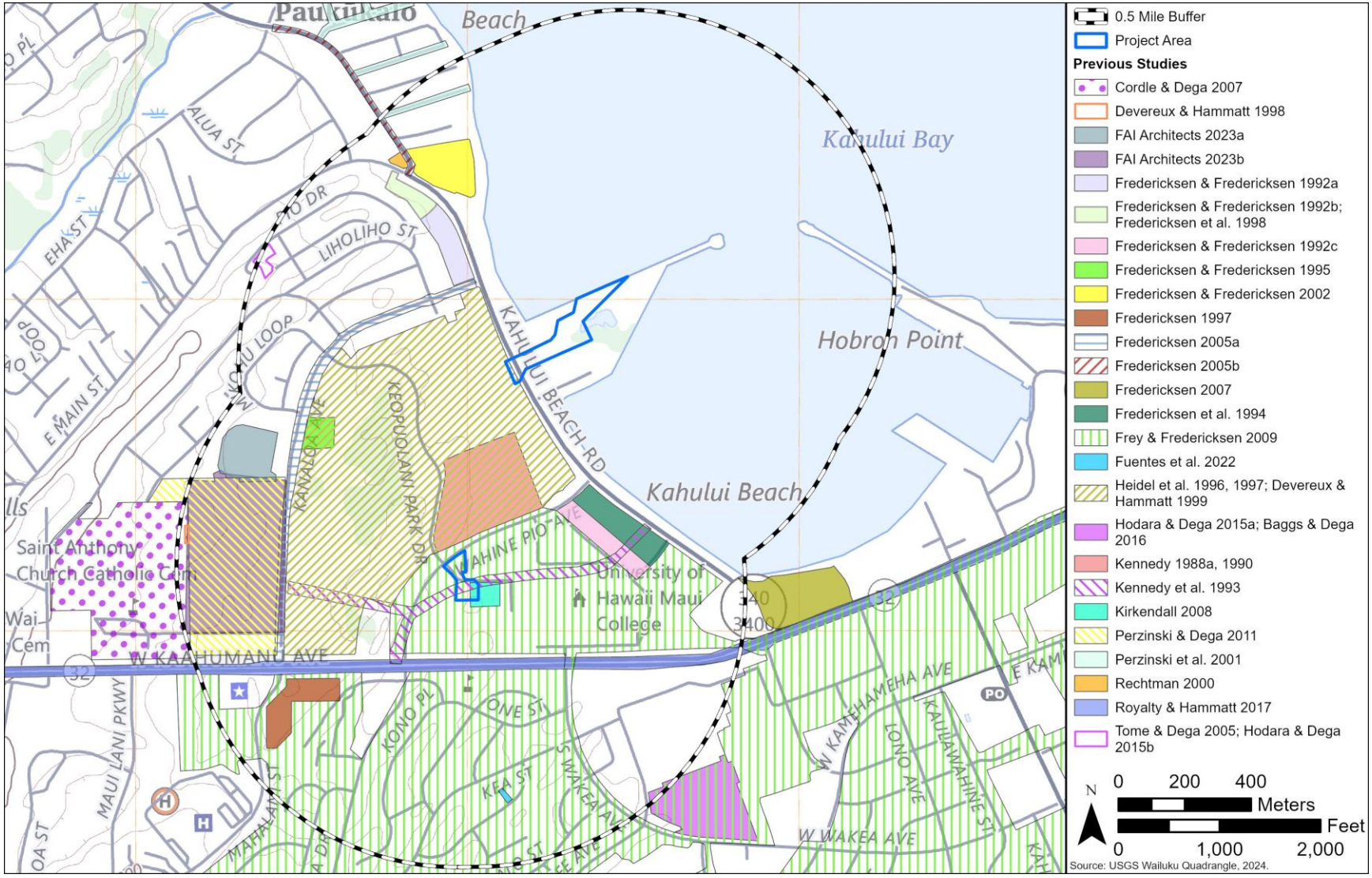


Figure 36. Previous archaeological studies conducted within 0.5 miles of the Maui portions of the HIFL project area.

Table 8. Previously Identified Historic Properties Within 0.5 Miles of the Maui Portions of the HIFL Project Area

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-50-04-00055	Platform-terrace	Malaihakoa Heiau	Pre-Contact	-	-	-	Status: destroyed	Walker 1931; On File, SHPD
50-50-04-01172	Burial, midden deposit	Burial, cultural layer	Unknown	-	-	-	None Provided	On File, SHPD
50-50-04-01630	Henry Perrine Baldwin High School	Education	Post-Contact	-	-	A, C	Preservation	Penkiunas 1992 (NRHP Nomination Form); Royalty and Hammatt 2017
50-50-04-02953	Kahului Harbor Historic District	Transportation; commerce	Post-Contact	-	a	-	None Provided	DLNR 1974
50-50-04-03112	Kahului Railroad Berm	Transportation	Post-Contact	-	a, d	-	Data Recovery and removal (Fredericksen and Fredericksen 1992b); Archaeological Monitoring (Fredericksen and Fredericksen 1992a, Heidel et al. 1997)	Fredericksen and Fredericksen 1992a, 1992b; Heidel et al. 1997; Fredericksen et al. 1998
50-50-04-03119	Refuse area	Trash Disposal	Post-Contact	-	d	-	Data Recovery; Archaeological Monitoring (Fredericksen and Fredericksen 1992b)	Fredericksen and Fredericksen 1992b; Fredericksen et al. 1998
50-50-04-03120	Subsurface cultural deposit, burial preserve	Unknown, burial preserve	Pre-Contact	-	d	-	Archaeological Monitoring (Fredericksen and Fredericksen 1992b)	Fredericksen and Fredericksen 1992b; Fredericksen et al. 1998

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-50-04-03135	Makaweli Rock Crusher Mill	Commercial	Post-Contact	-	-	-	None Provided	Fredericksen and Fredericksen 1992a
50-50-04-04211	Burial and reinterment site	Burial	Pre-Contact	-	e	-	Reinterred	Heidel et al. 1997; Devereux and Hammatt 1999
50-50-04-04232	Quonset huts	US military facility-18th Service Battalion Camp	ca. 1944	-	a, d	-	Partially removed; Concrete pads incorporated into existing park facilities	Heidel et al. 1997
50-50-04-04476	Burial	Burial	Pre-Contact	-	e	-	Reinterred	Devereux and Hammatt 1999; McElroy et al. 2024
50-50-04-04477	Burial	Burial	Pre-Contact	-	e	-	Reinterred	Devereux and Hammatt 1999
50-50-04-04478	Burial	Burial	Pre-Contact	-	e	-	Reinterred	Devereux and Hammatt 1999
50-50-04-04479	Burial	Burial	Pre-Contact	-	e	-	Reinterred	Devereux and Hammatt 1999
50-50-04-04668	Burial Complex (n=38)	Burial	Pre-Contact	-	-	-	Preservation	On File, SHPD
50-50-04-05212	Subsurface cultural layer with pit features	Habitation	Pre-Contact	-	d	-	Preservation; Archaeological monitoring	Fredericksen and Fredericksen 2002
50-50-04-05213	Concrete slab	Warehouse foundation	Post-Contact (c. 1920s-1940s)	-	d	-	Preservation; Archaeological monitoring	Fredericksen and Fredericksen 2002
50-50-04-05471	Burial	Burial	Pre-Contact	-	e	-	Reinterred with SIHP 50-50-04-05495	Fredericksen 2005a

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-50-04-05472	Burial	Burial	Pre-Contact	-	e	-	Preservation, reinterred with 50-50-04-05495	Fredericksen 2005a
50-50-04-05495	Burial	Burial	Pre-Contact	-	e	-	SHPD consultation; Archaeological Monitoring	Fredericksen 2005a
50-50-04-05496	Subsurface cultural layer with waterworn basalt and coral pavement	Habitation	Pre-Contact	-	d, e	-	SHPD consultation; Archaeological Monitoring	Fredericksen 2005a
50-50-04-05660	Complex	Permanent Habitation	Pre-Contact	-	d	-	Archaeological Monitoring	Fredericksen 2005a
50-50-04-07493	Burial	Burial	Pre-Contact	-	d, e	-	Burial Treatment Plan, Archaeological Monitoring	Hodara and Dega 2015b
50-50-04-07494	Pit features, cultural lens, burials	Habitation, burial	Pre-Contact	-	d, e	-	Burial Treatment Plan, Archaeological Monitoring	Hodara and Dega 2015b
50-50-04-08498	Structural remnant	Commercial/ Residential	Post-Contact	-	d	-	None Provided	Royalty and Hammatt 2017
50-50-04-08738	Burial	Burial	Unknown	-	-	-	None Provided	On File, SHPD
50-50-04-09016	Ichiro “Iron” Maehara Baseball Stadium	Recreation	Post-Contact	-	-	A, C	No further work/SHPD consultation	FAI Architects 2023a

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-50-04-09017	Coach Soichi Sakamoto Pool	Recreation	Post-Contact	-	-	A, C	No further work/SHPD consultation	FAI Architects 2023b
50-50-04-09018	Thomas "Cheena" Lau Hee Little League Field, Toshio "Tata" Fujimoto Baseball Field, and the associated Little League Fields' Restroom	Recreation	Post-Contact	-	-	A	No further work/SHPD consultation	FAI Architects 2023b

Note: historic properties located within the current project area are denoted by a gray highlight.

* Rather than using Hawai‘i Register of Historic Places significance criteria, PHRI assigned their own significance categories, which are defined as follows:
A=Important for information content, further data collection necessary (PHRI=research value);
X=Important information content, no further data collection necessary (PHRI=research value, DLNR-HPP=not significant);
B=Excellent example of site type at local, region, island, State, or National level (PHRI=interpretive value); and
C=Culturally significant (PHRI=cultural value).

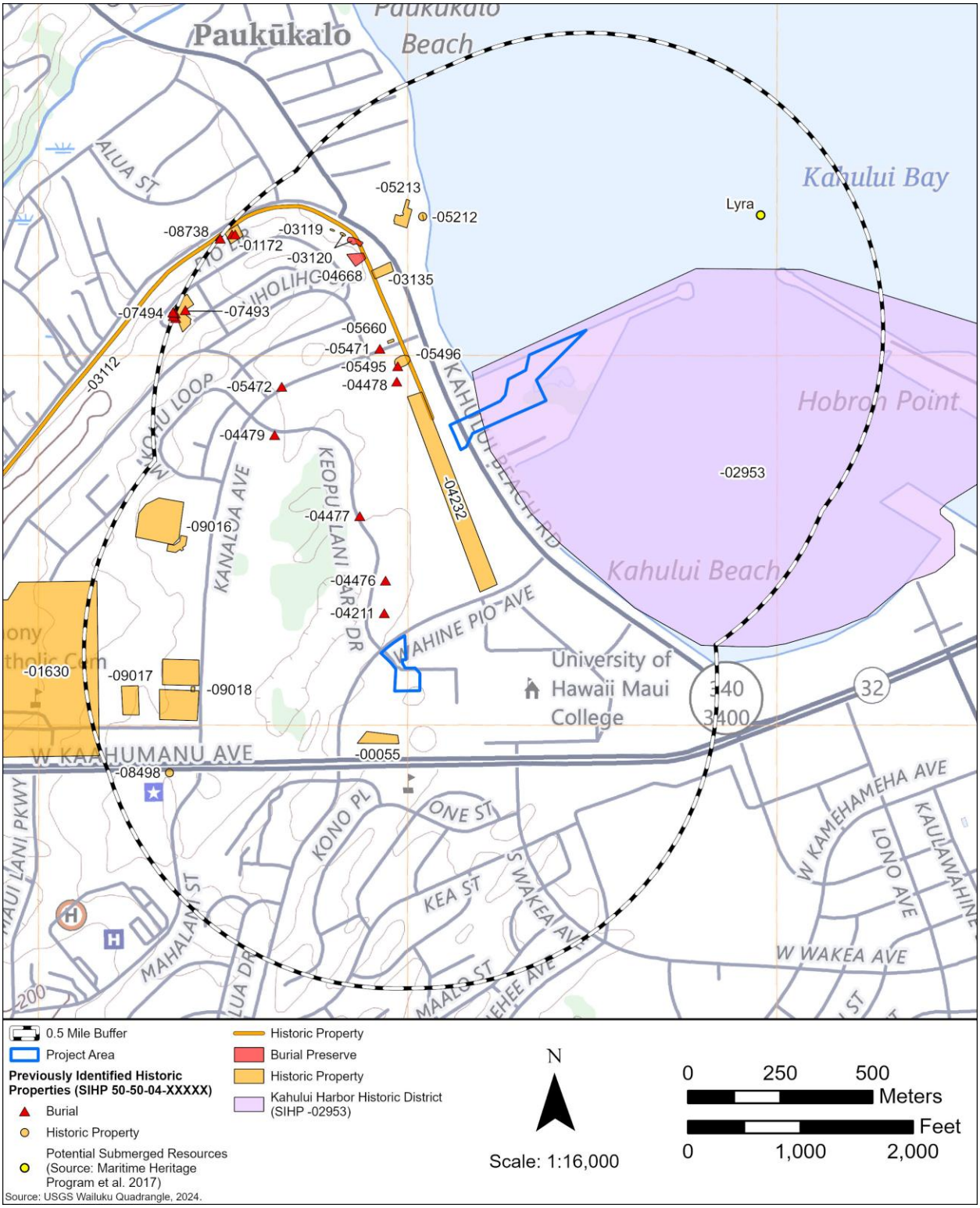


Figure 37. Previously identified historic properties within 0.5 miles of the Maui portions of the HIFL project area.

2.4 MOLOKAI CABLE LANDING SITE

2.4.1 Archival Research Summary

The Molokai portions of the HIFL project area are located within the traditional *moku* of Kona within the *ahupua'a* of Kaunakakai. Kaunakakai, formerly known as Kaunakahakai, which references the use of the harbor as a place for canoe landings and fishing, was and is a central location on the island of Molokai. It features prominently in recorded oral traditions and tales of *ali'i* vying for control of the O'ahu, Maui, and Hawai'i Island chiefdoms throughout the pre-Contact and early post-Contact period of Hawaiian history.

Several *mo'olelo* relate to Molokai, and specifically, to the area of Kaunakakai. These include origin myths centered on Hina, who conceived Molokai, as well as *mo'olelo* that describe the interactions of legendary men who traveled to and from Molokai, including Ku'ula, who was a man who was believed to possess *mana kupua* and was able to command all the fish in the sea and had a son named 'Ai'ai who traveled around the islands and established *ko'a* (fishing grounds, shrines). These *mo'olelo* speak to the centrality of fishing and traveling via canoe, and Kaunakakai serving as a key central place, not only for the south shore of Molokai, but of the entire archipelago.

The rich marine resources, which include good fishing areas and gathering places for resources such as *aloalo* (squilla, or mantis shrimp) in Kaunakakai and the southern coast of Molokai were likely one factor that led to this region being densely settled throughout the pre-Contact period. The relatively calm fringing reefs also provided ideal conditions for the development of aquaculture, with at least 58 *loko i'a* (fishponds) being constructed along the leeward coast of the island. The rainfall in the upper valleys flowed down to the coast and enabled the development of intensified wetland agriculture, as well as dryland, rain-fed systems where *kalo*, *'uala* (sweet potato, *Ipomoea batatas*), and *pili* grass (*Heteropogon contortus*) were grown in the *kula* (open country, pasture) lands of Kaunakakai.

During the Mahele, no LCAs were awarded in the *ahupua'a* of Kaunakakai. This area was owned by Kalani Pueo and subsequently passed to Abner Pākī, father of Bernice Pauahi Bishop. The entire *ahupua'a* was purchased by Kamehameha V, who built a large, secluded estate, Mālama, near Kaunakakai Harbor (Figure 38). During a gathering at his compound during the 1860s, he met with a British count, who suggested building a large salt works nearby. Kahapa'akai, the first large scale salt works on Molokai, was located in Kawela Ahupua'a to the east of Kaunakakai.

Following the death of Bernice Pauahi Bishop, Kaunakakai Ahupua'a was passed to the trustees of her estate, and in 1897, Molokai Ranch purchased the *ahupua'a* from the trustees. The ranch subsequently incorporated the American Sugar Company and developed the Kaunakakai Harbor and wharf area, installing a narrow-gauge railroad to facilitate the export of sugar and later, pineapple and cattle. Kaunakakai remained the island's main shipping port and vital to the island's economy throughout the mid-twentieth century, and continues to be the main shipping port to the present day. Following the end of large-scale agriculture, Kaunakakai Town remained Molokai's major residential, commercial, and civic center (Figure 39).

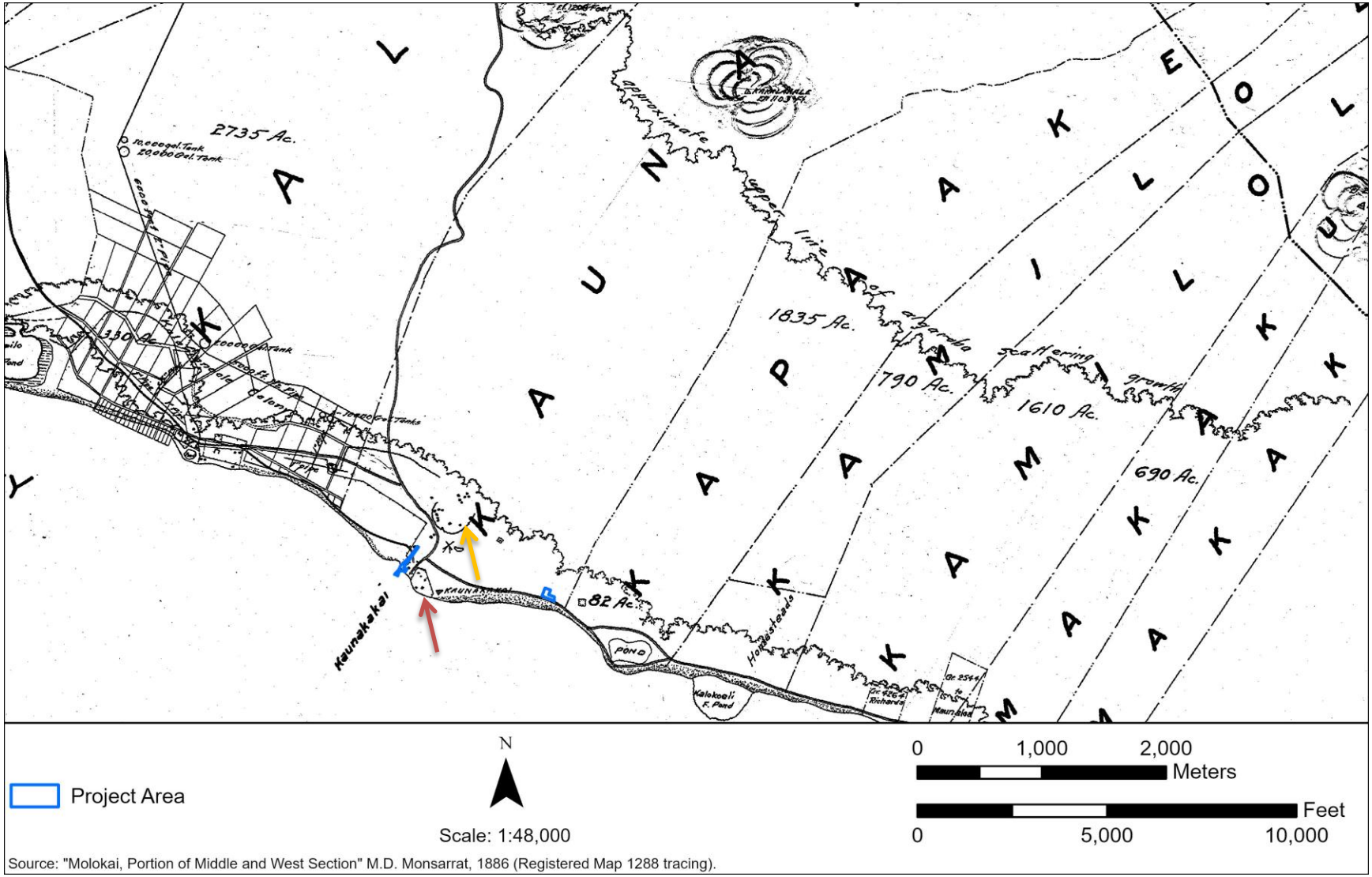


Figure 38. An 1886 map showing the Molokai portions of the HIFL project area within Kaunakakai Ahupuaʻa, with the Molokai Yacht Club portion located in the vicinity of the Kamehameha V compound (red arrow) and the walled Kaunakakai Town (orange arrow).

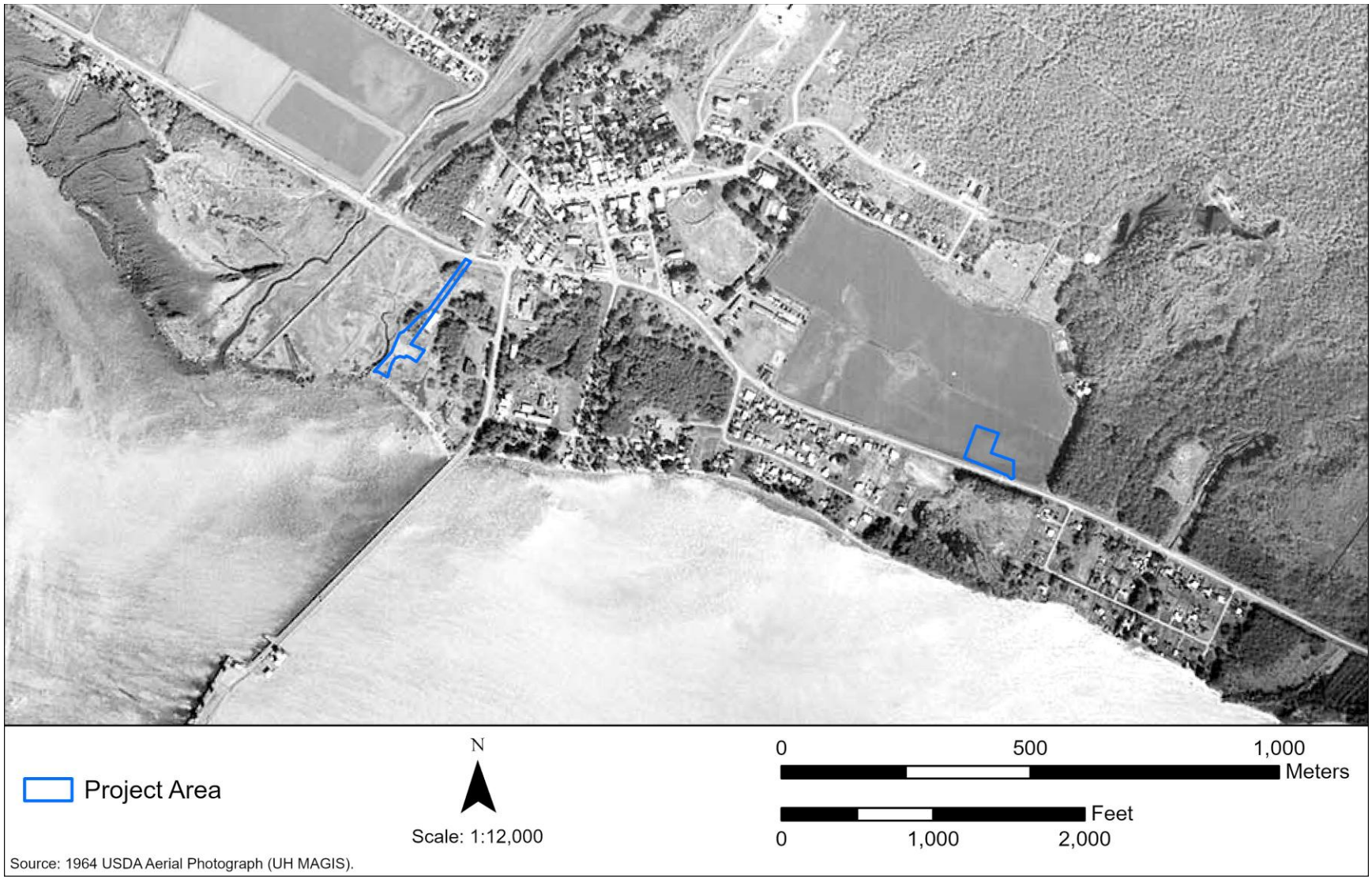


Figure 39. A 1964 aerial photograph showing slight growth of Kaunakakai Town but more marked increased habitation on the *makai* side of Kamehameha V Highway.

2.4.2 Previous Archaeology

A total of 33 archaeological studies have been conducted within a 0.5-mile (0.8-km) buffer around the Molokai portions of the HIFL project area (Figure 40).

Table 9 provides an overview of all 33 archaeological investigations with a summary of their findings. The 19 previously identified historic properties within the 0.5-mile buffer are described in Table 9, which also contains significance assessments and mitigation recommendations. These historic properties are shown on Figure 41.

The historic properties identified in the vicinity of these portions of the project area reflect the continuous use of the south coastal flats of Kaunakakai during pre-Contact times for habitation, ceremonial practices, salt production, and agriculture. These sites include *heiau*, cultural deposits containing artifacts, midden, and charcoal, which yielded a calibrated radiocarbon date of AD 1230–1340 (Athens and Silva 1983), as well as a habitation complex and a possible burial. Post-Contact historic properties are largely associated with agricultural, industrial, and infrastructural activities and include walls and enclosures for animal husbandry, refuse pits, levees, the Molokai Public Library, and remnants of the wharf and railroad related to the American Sugar Company.

Two historic properties have been documented within the Molokai Yacht Club portion of the HIFL project area: SIHP 50-60-03-00630 (Athens and Silva 1983, Komori 1983) is a pre-Contact cultural deposit and 50-60-03-02573 (Lee-Greig et al. 2016) is a post-Contact cultural deposit consisting of a burn area with associated remnant building material, including glass, ceramic, and metal.

Komori (1983) provided the following description of SIHP -00630 (Bishop Museum Site Number 50-Mo-B1-6):

> No prehistoric or early historic surface features are present on the property. This may be the result of modern land alterations. It is possible, however, that intact cultural deposits exist below the surface. Near the western boundary of the property, an area of grayish coral sand apparently represents an exposed cultural deposit. Designated Site 50-Mo-B1-6,* this deposit covers an area of approximately 70 m^2 (700 ft^2) and extends into the adjoining parcel ... Cultural activity is indicated by the presence of prehistoric-type midden, including marine shells and fish bone, and numerous charcoal fragments. In addition, two prehistoric-type artifacts were recovered from the surface of the site, along with one artifact from the historic period: a basalt grinding or polishing stone (B1-6-1), a coral abrader (Bl-6-2), and a pearl-shell button, probably of local manufacture (B1-6-3). These artifacts have been deposited at the Bishop Museum.
>
> A screw-type auger (1-in. diameter) was used to probe the cultural deposit to a depth of 75 cm (30 in.) in four areas of the site ... Exposed cuts in the area were also examined, and an attempt was made to probe areas outside of the exposed deposit; however, the compacted surface was too hard for the auger to penetrate. (Komori 1983:7)

Komori's recommendations consisted of the following:

> In view of (1) the presence of possibly intact subsurface deposits, and (2) the proximity of the former location of the residence compound of Kamehameha V, it is essential that further archaeological work and historic research be conducted prior to further alterations to the project area. The archaeological work should consist of the following tasks:

(1) Systematic test excavations at Site Mo-Bl-6 to determine the nature and extent of the deposit.
(2) Systematic test excavations in Area A.
(3) Trenching in the vicinity of the parking lot, to determine the presence or absence of cultural deposits, and to provide a stratigraphic control for the test excavations.
(4) Trenching across the property to determine the presence or absence of cultural deposits.

In view of the dense compacted nature of the surface, the recommended trenching would be best done with a backhoe; the test excavations would be done by hand using standard archaeological techniques.

Based on the results of the testing phase, recommendations will be made with respect to final deposition of the cultural resources on the property. The need for further archaeological work will be assessed at that time. (Komori 1983:8)

Athens and Silva (1983) also provided the following description of SIHP 50-60-03-00630:

B1-6 surface remains were found to occupy roughly the area indicated on Komori's (1983:3) site map, except that the site extended somewhat further to the east. This area corresponded to the remaining vegetated zone on the property, a factor suggestive of recent disturbance as a determinant of the distribution of surface remains. This notion was born out by the subsurface investigations Area A, which was only 10 m^2 could not be located despite the bare ground and compass and tape measurements. It is assumed that Area A may have been only an unrecognized eastern extension of the B1-6 site, or else the surface midden was so sparse as to be almost undetectable. In any case, this project's fieldwork demonstrated that the surface archaeological remains bear no relationship to subsurface remains, and that the latter, in some degree, cover much of the project area. The location of Area A, therefore, became inconsequential with the results of the subsurface findings. (Athens and Silva 1983:29)

A total of 12 features were identified in the excavation units ... Eight are hearths (including two possible hearths), two are post molds, one is a pit, and the last is a possible wall. (Athens and Silva 1983:56)

Athens and Silva's recommendations included the following:

1) The best location for the ice plant/cold storage facility would be on the eastern side of the parcel in the area.... This area includes the southeastern quadrant and roughly the eastern one-third of the parcel north of the southeastern quadrant. Archaeological deposits in these areas are either absent or highly disturbed. No further archaeological investigations need be undertaken in this area, except as concerns an archaeological monitor as indicated below. This area, it should be mentioned, contains the weigh station. However, there is no reason to insist on its preservation as it has now been both photographed and mapped.
2) Land alteration or construction of any type should not be permitted on the remaining western side of the parcel without prior archaeological salvage excavation. This part of the property has the densest archaeological remains from both the historic and prehistoric periods. The prehistoric deposits constitute a valuable resource for purposes of scientific research. Trench 6 is included in this area as it could contain important structural remains from the historic period. Further investigation will be needed to clarify the nature of the Tr-6 deposits.
3) Landscaping of the western side of the property is permissible as long as subsurface excavation is not required. The only exception is for the planting of occasional trees and bushes. Holes for these plants should not exceed 18 inches in depth.

4) Additional historical studies are not needed at this time.
5) An archaeological monitor, should be present for all subsurface construction work on the eastern side of the property. The developer must provide funds to the monitor for the processing and reporting upon and archaeological materials that may be disclosed during the course of construction activities. This would include charcoal samples for radiocarbon dating, midden samples, bone, or other materials and artifacts that may be recovered and deemed appropriate for further study and reporting. (Athens and Silva 1983:86-88)

Lee-Greig et al. (2016) provided the following description of SIHP 50-60-03-02573:

> SIHP 50-60-03-2573 (SIHP-2573) is a subsurface cultural deposit identified within Backhoe Trench 21 (BT-21) during the course of subsurface testing … the overall horizontal extent for which was determined through the excavation of two perpendicularly placed test trenches. SIHP-2573 covers an area measuring roughly 7.3 m north-south by 5.0 m east-west … and ranges thickness from 2 to 5 cm. Located below two fill layers, Strata Ia and Ib, the burn layer itself was documented within Stratum II/IIa, and overlies C-horizon sediment ... The heat of the burn event is indicated by the thermally altered characteristics of the contact between the burn layer and unaltered sediments of Stratum IIA at the northernmost extent where the clay of Stratum lib sediment has been hardened, or baked, by the heat.
>
> Cultural material collected from the burn layer consists of glass fragments, kukui nut fragments, shell fragments, a nail, as well as fragments of a stone fruit pit (see also Section 5.1 Artifact Analysis). Based on the cultural material content recovered from the burn layer, it is possible that the activities associated with this burn layer may be contemporaneous with the historic era activities that formed the cultural deposit (SIHP-630) identified by Komori (1983) and Athens (1983) in TMK (2) 5-3-01:2 on the southwest side of the Kaunakakai Place and Hio Place intersection (Lee-Greig et al. 2016:38).

Lee-Greig et al. (2016) assessed SIHP -02573 as significant under criterion d. Given the extensive documentation available for the site, the study concluded that there would be "no historic properties affected." However, due to the potential for encountering sensitive cultural remains within the project area, archaeological monitoring was recommended during all ground-disturbing activities (Lee-Greig et al. 2016:96).

No historic properties were previously identified within the portion of the HIFL project area at Molokai Education Center.

Table 9. Previous Archaeological Studies within 0.5 Miles of the Molokai Portions of the HIFL Project Area

Reference	Type of Study	Findings
Stokes 1909	Archaeological Survey	Documented *heiau* and other significant structures in an unpublished, island-wide survey.
Summers 1971	Site Survey	Built on work by Stokes (1909) and others to build a comprehensive archaeological survey of Molokai Island. Identified four historic properties within 0.5 miles of the current project area: SIHP 50-60-03-00129, Kaunakakai Saltworks; 50-60-03-00130, Kamalae Heiau; 50-60-03-00131, Māhinahina Heiau; and 50-60-03-00132, Kahua Maika. No significance assessments or mitigation recommendations were made.

Reference	Type of Study	Findings
Davis 1977	Cultural Reconnaissance	Identified one historic property within 0.5 miles of current project area: SHIP 50-60-03-01600, a complex of seven agricultural features, including enclosures, platforms, a house site, a terrace, a mound, stone alignments, and a suspected post-Contact burial. The site was recommended for preservation, and no assessment of significance was made.
Shun 1982	Archaeological Investigation	Identified two historic properties within 0.5 miles of the current project area: Site 50-Mo-B1-5, later assigned SIHP 50-60-03-00631, a buried cultural layer dated to A.D. 1819±50, and post-Contact parallel mounds of unknown function (no SIHP number assigned). SIHP -00631 was assessed as significant (no significance criteria were provided) and recommended for mapping, controlled excavations, and monitoring. No significance assessment or recommendations were made for the parallel mounds.
Komori 1983	Archaeological Reconnaissance Survey	Identified one historic property within the current project area: Site 50-Mo-B1-6, later assigned SIHP 50-60-03-00630, a buried cultural layer containing marine midden, charcoal fragments, two pre-contact artifacts (basalt grinding stones and coral abrader), and a post-Contact pearl-shell button. The site was recommended for further archaeological work and historic research. No significance assessment was provided.
Athens and Silva 1983	Archaeological and Historical Investigation	Relocated one previously identified historic property, SIHP -00630 within the current project area. A total of 12 subsurface features consisting of eight hearths, two post molds, one pit, and a possible wall were identified. One hearth feature yielded a radiocarbon date of AD 1230–1340. The site was recommended for archaeological monitoring for all subsurface construction activities. No significance assessment was made.
Landrum 1984	Archaeological Reconnaissance Survey	Identified a cultural deposit: Site 50-Mo-B1-7, later assigned SIHP 50-60-03-00632, as well as two associated artifacts (an adze fragment and a discoidal vesicular basalt hammerstone), and two additional features (a mortar-and-stone foundation and a refuse pit; no SIHP number assigned). The site and features are located on the northwestern boundary of the current project area. The report recommended further archaeological investigation to determine the nature and extent of subsurface deposits throughout the project area. No assessment of significance was provided.
Kennedy 1988b	Archaeological Surface Survey and Subsurface Testing	No historic properties identified.
Weisler 1989	Archaeological Inventory Survey	Documented three previously identified historic properties, none of which were located within 0.5 miles of the current project area.
Tuggle 1993	Archaeological Excavations	Documented three historic properties: SIHP -00630, the previously identified cultural deposit; 50-60-03-00890, the “old pier”, and 50-60-03-01030: the Mālama Platform which was once the location for a summer house of Kamehameha V, a building for Kalaiakamanu Church, and Māhinahina Heiau. SIHP -00630 is located within the current project area and the other two are within the 0.5-mile buffer. This study focused on the excavation and documentation of SIHP -01030, which was assessed as significant (no criteria provided) and recommended for preservation and additional archaeological excavation. No assessment of significance and recommendations were provided for the other sites.

Reference	Type of Study	Findings
Borthwick and Hammatt 1994	Archaeological Inventory Survey	Identified two new historic properties within 0.5 miles of the current project area: SIHP 50-60-03-00895, a habitation enclosure with 3 features; and 50-60-03-00896 a post-contact boulder wall for animal husbandry. Both sites were interpreted as being post-Contact, assessed as significant under Criterion d, and recommended for data recovery. SIHP -00396 was also recommended for preservation "as is."
Heidel et al. 1998	Archaeological Data Recovery	Data recovery of two previously identified historic properties (SIHP -00895 and -00896) located within 0.5 miles of the current project area. SIHP -00895 was reinterpreted as a post-Contact work and storage area and SIHP -00896 was interpreted as a post-Contact wall built to keep out roaming cattle and delineate property boundaries. No significance assessments or mitigation recommendations were made.
Titchenal 1998	Archaeological Monitoring	Identified five additional features of previously identified historic property, SIHP -00630, within 0.5 miles of the current project area. Fe. 1, 3, and 5 are post-Contact refuse deposits, Fe. 4 is a basal cobble pavement with associated post-Contact and midden material, and Fe. 5 is a pit-shaped disconformity suggested to be an extension of a post-Contact trash pit located nearby. SHIP -00630 was recommended for testing and data recovery prior to construction monitoring. No significance assessment was provided.
McGerty and Carson 1999	Archaeological Inventory Survey	Identified three additional features of a previously identified historic property, SIHP -00895, located within 0.5 miles of the current project area. Feature D is a paved terrace, Feature E is a small alignment of basalt stones, and Feature F consists of two adjoined small terraces. No further work was recommended, and no significance assessment was made.
McGuire and Hammatt 2000	Archaeological Monitoring	No historic properties identified.
Hammatt 2001	Archaeological Assessment	Assessed six sections of the 36-mile study route for potential to encounter subsurface historic properties and make recommendations for further archaeological work. Only Section 5 that extends from "Maunaloa Highway (460) along the Kamehameha Coconut Grove to Kaunakakai Place, then Kamehameha V Highway (450) from Kaunakakai Place to the west side of Kanoa Fishpond" is located within 0.5 miles of the current project area. Section 5 was assessed as having moderate probability for encountering archaeological resources and recommended for on-call monitoring. No assessment of significance was made.
Dye and Jourdane 2006a	Archaeological Assessment	No historic properties identified.
Dye and Jourdane 2006b	Archaeological Assessment	No historic properties identified.
McGerty and Spear 2006	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Muise and Rechtman 2008	Archaeological Monitoring	No historic properties identified.
Madeus and Hammatt 2010	Archaeological Monitoring	No historic properties identified.
Desilets 2011	Archaeological Monitoring	No historic properties identified.

Reference	Type of Study	Findings
McElroy et al. 2013	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Medrano and Dega 2013	Archaeological Monitoring	No historic properties identified.
Sprouse et al. 2013	Archaeological Monitoring	No historic properties identified.
McElroy and Elison 2014	Archaeological Monitoring	Identified two historic properties (SIHP 50-60-03-02514 and 50-60-03-02523) located within 0.5 miles of the current project area. These included two post-Contact walls: SIHP -02514 is potentially associated with early 20th century American Sugar Co. activities and SIHP -02523 likely served as structural support for the wharf dating to 1928. SIHP -02514 was removed to continue excavation, however remnants may still exist under Kaunakakai Place. SIHP -02523 was left in place and reburied. Both historic properties were assessed as significant under Criterion d and archaeological monitoring was recommended for any further ground disturbing work in their vicinity
Stine et al. 2014	Archaeological Monitoring	Identified one historic property (SIHP 50-60-03-02525) located within 0.5 miles of the current project area. This consists of a boulder fill for an 1898 American Sugar Co. railway. The historic property was assessed as significant under Criteria a and d, and an AIS was recommended prior to further ground disturbing activities in the vicinity of the historic property.
McElroy and Eminger 2015a	Archaeological Inventory Survey	Identified two historic properties (SIHP 50-60-03-00896 and 50-60-03-02563) located within 0.5 miles of the current project area. This included a post-Contact wall that may have functioned to keep cattle out of Kaunakakai Town and two parallel levees on the east and west banks of Kaunakakai Stream. Both sites were assessed as significant under Criterion d. SIHP -02563 was recommended for modification, reuse, and archaeological monitoring, while SIHP -00896 was recommended for avoidance and archaeological monitoring for future work in the vicinity.
McElroy and Eminger 2015b	Archaeological Monitoring	No historic properties identified.
Lee-Greig et al. 2016	Archaeological Inventory Survey	Identified one historic property (SIHP 50-60-03-02573) located within the current project area. SIHP -02573 is a subsurface cultural deposit consisting of a burn area and associated historic material. The site was assessed as significant under Criterion d and no further work was recommended. Archaeological monitoring was recommended for all ground disturbing work in the overall project area.
McIntosh et al. 2020	Archaeological Inventory Survey	Documented 18 pre- and post-Contact historic properties: 15 were newly identified historic properties and three were previously identified historic properties. None of these sites are located within 0.5 miles of the current project area.
Gross et al. 2022	Archaeological Monitoring	No historic properties identified.
Fechner et al. 2025	Archaeological Monitoring	No historic properties identified.

Note: Previous studies that include the current project area are highlighted in gray.

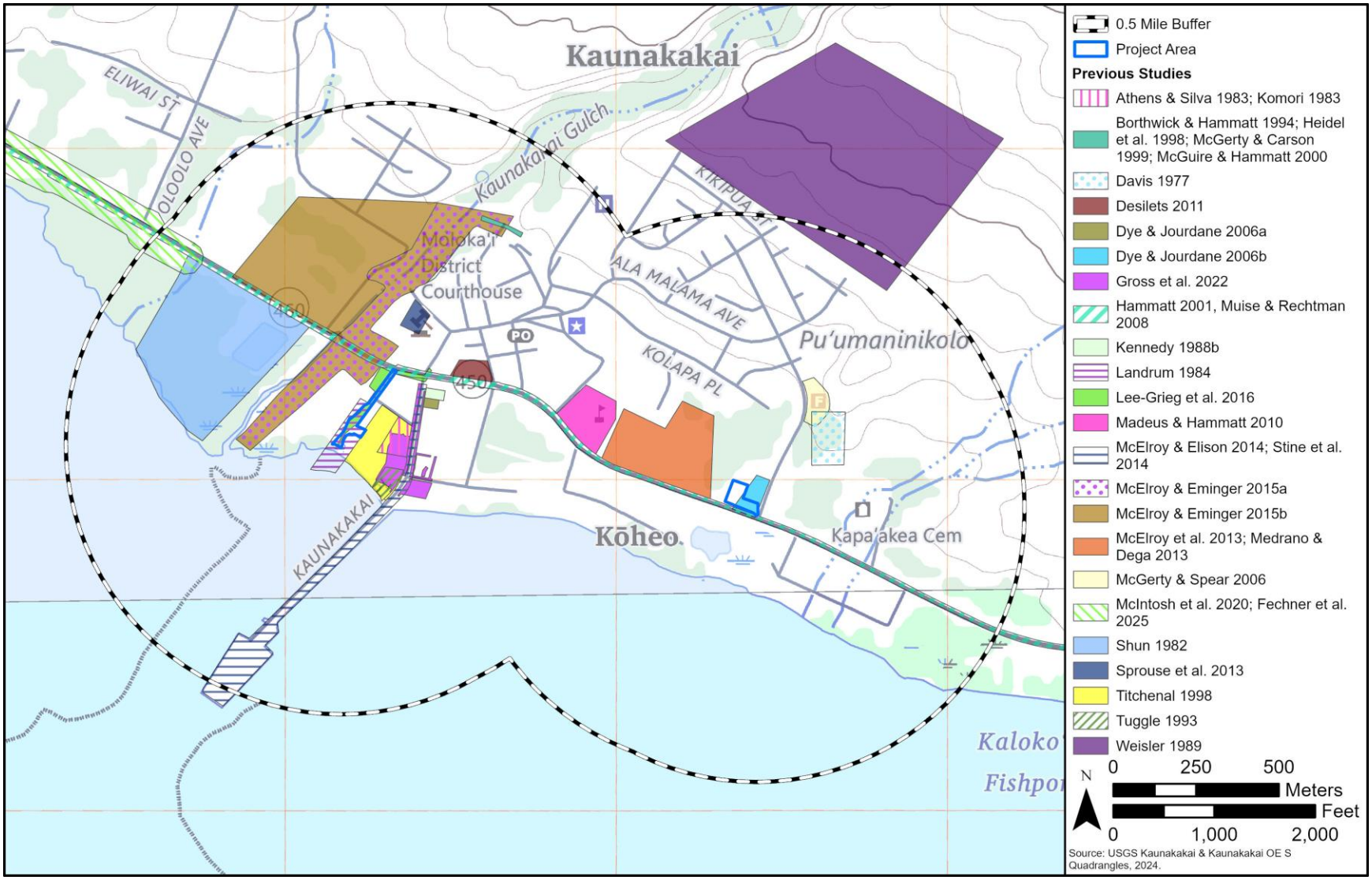


Figure 40. Previous archaeological studies conducted within 0.5 miles of the Molokai portions of the HIFL project area.

Table 9. Previously Identified Historic Properties Within 0.5 Miles of the Molokai Portions of the HIFL Project Areas

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-60-03-00129	Kaunakakai Salt Works	Salt production	Post-Contact	-	-	-	None provided	Summers 1971
50-60-03-00130	Kamalae Heiau	Ceremonial	Pre-Contact	-	-	-	None provided	Summers 1971
50-60-03-00131	Mahinahina Heiau	Ceremonial	Pre-Contact	-	-	-	None provided	Summers 1971
50-60-03-00132	Kahua Maika	Recreation	Pre-Contact	-	-	-	None provided	Summers 1971
50-60-03-00630	Cultural deposit	Habitation	Pre-Contact	-	-	-	Data Recovery (Komori 1983, Titchenal 1998); Archaeological Monitoring (Athens and Silva 1983)	Komori 1983; Athens and Silva 1983; Titchenal 1998
50-60-03-00631	Cultural deposit	Habitation	Pre- to early post-Contact	-	-	-	Data Recovery/ Monitoring	Shun 1982
50-60-03-00632	Cultural deposit	Habitation	Pre-Contact	-	-	-	Data Recovery	Landrum 1984
50-60-03-00890	Wharf remnants (stone alignment)	Shipping	Post-Contact	-	-	-	Preservation	Tuggle 1993
50-60-03-00895	Enclosure	Activity area; storage	Post-Contact	-	d	-	Data Recovery (Borthwick and Hammatt 1994); No Further Work (McGerty and Carson 1999)	Borthwick and Hammatt 1994; Heidel et al. 1998; McGerty and Carson 1999
50-60-03-00896	Wall	Animal husbandry	Post-Contact	-	d	-	Preservation (Borthwick and Hammatt 1994); Avoidance (McElroy and Eminger 2015a)	Borthwick and Hammatt 1994; Heidel et al. 1998; McElroy and Eminger 2015a
50-60-03-01030	Mālama platform	Ceremonial	Pre-Contact	-	-	-	Preservation	Tuggle 1993
50-60-03-01037	Moloka'i Public Library	Education	1937	-	-	A, C	Preservation	NRHP Nomination Form

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-60-03-01600	Complex (enclosures platforms, terraces, mounds, alignments, trail)	Habitation; possible burial	Pre- and post-Contact	-	-	-	Preservation	Davis 1977
50-60-03-02514	Wall, potentially associated with American Sugar Co. activities	Agriculture	Possibly early 20th century	-	d	-	Archaeological Monitoring	McElroy and Elison 2014
50-60-03-02523	Wall, potentially associated with the wharf	Likely structural support	ca. 1928	-	d	-	Archaeological Monitoring	McElroy and Elison 2014
50-60-03-02525	Boulder fill, possibly for a railway built by American Sugar Co.	Structural	ca. 1898	-	a, d	-	Archaeological Inventory Survey	Stine et al. 2014
50-60-03-02563	Walls	Levees (Water Control)	1950s	-	d	-	Modification/ Reuse/ Archaeological Monitoring	McElroy and Eminger 2015a
50-60-03-02573	Cultural deposit (burn area with associated remnant building material, glass, ceramic, and metal)	Indeterminate	Post-Contact	-	d	-	No Further Work	Lee-Greig et al. 2016
No SIHP No.	Subsurface linear mounds located at the water table	Possible salt production	Post-Contact	-	-	-	No Further Work	Shun 1982

Note: Previous studies that include the current project area are highlighted in gray

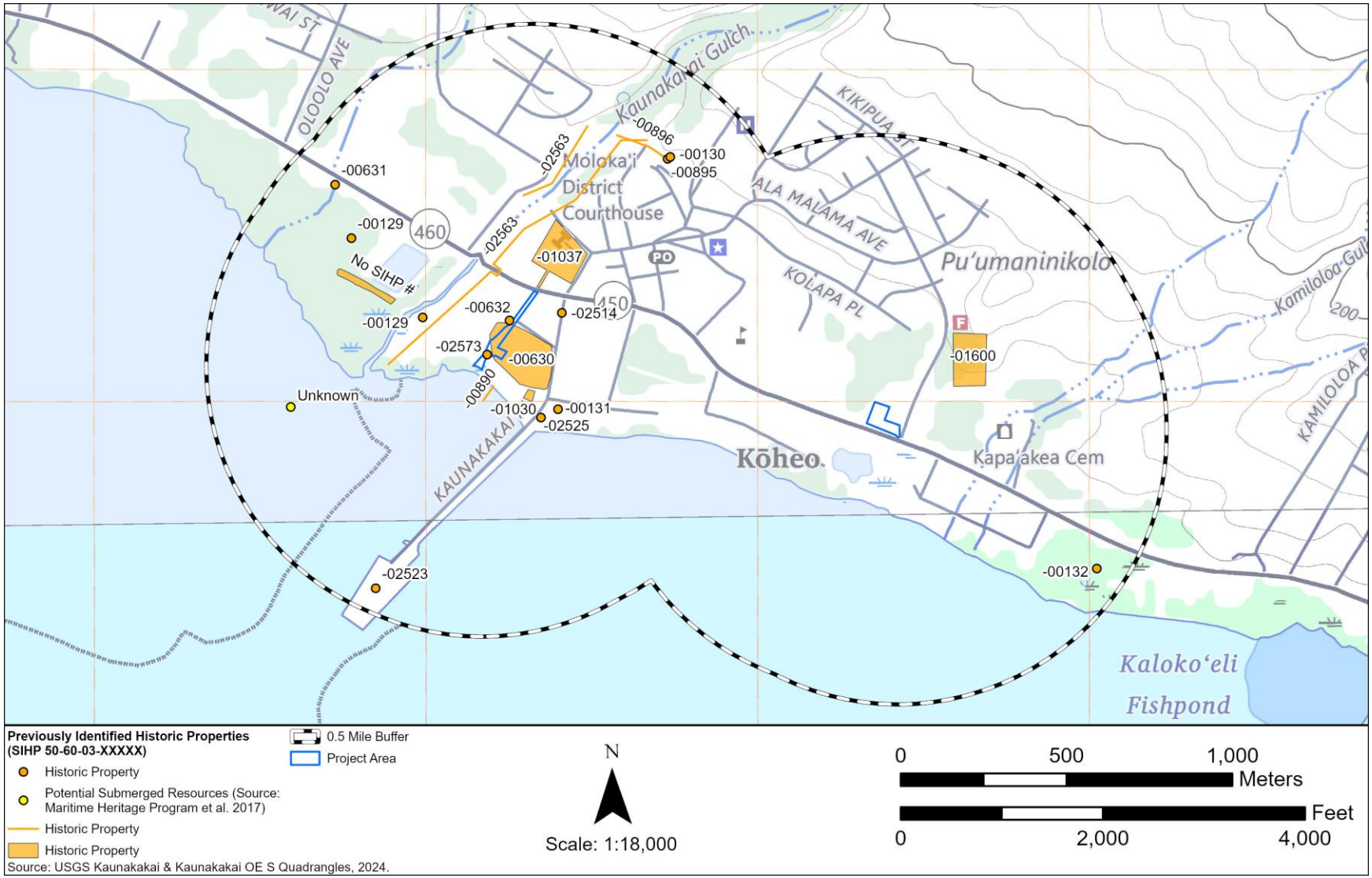


Figure 41. Previously identified historic properties within 0.5 miles of the Molokai portions of the HIFL project area.

2.5 LĀNAʻI CABLE LANDING SITE

2.5.1 Archival Research Summary

The Lānaʻi portion of the HIFL project area is located within the *ahupuaʻa* of Pālāwai, one of four *ahupuaʻa* which cross over the top of the island of Lānaʻi to encompass portions of both its windward and leeward sides. The project area lies within Mānele, located on the southern coastal end of Pālāwai Ahupuaʻa (Figure 42). Mānele translates to "sedan chair," and may be named for the Chiefess Kaʻuaʻumokuokamānele, daughter of Governor Kuakini. It is also said to be associated with passengers being carried up from their canoe landing to the dry shore. The *moʻolelo* connected to Puʻupehe, an islet off the shore of Pālāwai, recounts the love story of Puʻupehe, a daughter of a Maui Chief, and Makakehau, a warrior of Lānaʻi. The islet contains a small platform and low stone wall, where Puʻupehe was said to be buried by Makakehau after she drowned. The *moʻolelo* as recounted by Gibson also references a number of valued resources and cultural practices along the way. This includes: fishing for *kala* (bluespine unicornfish; *Naso unicornis*) and *aku* (skipjack tuna; *Katsuwonus pelamis*) in the clear waters of Kalulu; the cave of Malauea; the "great ravine" of Pālāwai and eating *ʻuwaʻu, or ʻuaʻu* (petrel; *Pterodroma phaeopygia sandwichensis*) bird baked in *kī* leaf with sweet *pala* (*Marattia douglasii*) fern root and *ʻōhelo* (Vaccinium reticulatum) berries; the cool waters of Maunalei; catching *ʻiʻiwi* (scarlet honeycreeper; *Drepanis coccinea*) and scarlet *ʻapapane* (Hawaiian honeycreeper; *Himatione sanguinea*) birds in the Pulou Ravine; the banana groves of Waiakeakua; baking *honu* (Hawaiian green sea turtle; *Chelonia mydas*) in Malauea; and the burial area of Mānele. When Puʻupehe died, she was wrapped in bright *kapa* (barkcloth) and adorned in *nāʻū* (gardenia; *Gardenia brighamii*). Another *moʻolelo* connected to Puʻupehe and related by Fornander referenced the shark Puaiki, who traveled between Papawai on Maui and Mānele.

The sheltered bay of Mānele, which provided abundant marine resources and a launch for travels to and from Lānaʻi, was a favored location and home to a permanent pre-Contact village. The gulch Kaupakuea is named for the thatched ridge poles of the many house sites that once populated Mānele, and the gulch was lined with house sites, terraces, enclosures, and mulch pits which likely grew a wide variety of crops including *kalo*, *ʻuala* (sweet potato; *Ipomoea batatas*), *niu* (coconut; *Cocos nucifera*), *milo* (*Thespesia populnea*), *noni* (*Morinda citrifolia*), *kou* (*Cordia subcordata*), *hala* (screwpine; *Pandanus tectorius*), and *wiliwili* (*Erythrina sandwicensis*). A number of pre-Contact trails ran along the shore and connected the coast to the uplands. As with many of the more recent roads on Lānaʻi, the road leading from Mānele Harbor to the uplands of Pālāwai was adapted from the pre-Contact trail system. The sand dunes extending behind Mānele are known to contain burials. They have also been home to indigenous seabirds like *ʻuaʻu kani* (wedge-tailed shearwater; *Ardenna pacifica*). Though there was limited freshwater on the coast, *kūpuna* (elders) knew how to dive into the nearshore waters to find freshwater sources that seeped from cracks in the rocks.

After Kalaniʻōpuʻu's forces were defeated on Maui Island, they settled on Lānaʻi for a time that proved highly destructive for the region. The war on Lānaʻi became known as '*Ka-moku-hi'*, or "the-land-of-loose-bowels," as the destruction of land and water drove people to eat the *kupala* root (*Sicyos pachycarpus*), known for loosening the bowels. The destruction wrought by Kalaniʻōpuʻu's forces evidently started a trend in population decline that Lānaʻi was never able to recover from. This also began a trajectory of deforestation, which not only removed lumber resources and native habitat, but also reduced Lānaʻi's groundwater resources. The 1804 arrival of foreign ships, and the foreign diseases they carried, continued the population devastation and by 1902, the native population had dropped from an estimated 6,000 people in 1793 to just 80. At the same time, the

island saw large influxes of outside arrivals during the establishment of the Mormon mission and the Maunalei Sugar Company plantation.

Pālāwai Ahupuaʻa was awarded to Chiefess Kekauʻōnohi during the Mahele, and passed to her husband, Levi Haʻalelea, upon her death in 1851. A portion of LCA 10041, awarded to Kanekileia in the group claim under Lono et al. (Helu 10024 through 10058), lies within the project area. This parcel was known to contain a house site and sweet potato patch.

For better or worse, Walter Murray Gibson's arrival to Pālāwai was undoubtedly transformative to land use and tenure on Lānaʻi. Gibson arrived in 1861 to reinvigorate the Mormon mission that was first established in Pālāwai in 1853. During his short tenure as a Mormon missionary (Gibson was excommunicated in 1864), he managed to raise sufficient funds to purchase the entire *ahupuaʻa* of Pālāwai from Levi Haʻalelea in 1863, which he held in free title under his own name. Gibson would later entrust the family sheep ranch on Lānaʻi to his daughter Talula and move to Oʻahu to undertake political maneuvering that would help him consolidate control over more land on Lānaʻi. By 1875, Gibson had secured approximately nine-tenths of Lānaʻi Island through fee-simple titles or long-term leases. During Gibson's time, a boat landing was developed at Mānele and many existing pre-Contact foot paths were developed into formal roads, including one that led from Mānele to the uplands of Pālāwai. A large number of invasive mammals were introduced for Gibson's ranching efforts, and Maly (2013) estimated that by the 1890s, nearly 100,000 sheep and goats roamed Lānaʻi with minimal oversight.

In 1902, four years after Gibson's passing, his family sold the land to Charles Gay. Gay succeeded at consolidating nearly the entire island of Lānaʻi under a single, fee-simple owner, but became overstretched in the process and most of Lānaʻi was taken over by the Lanai Company, Ltd., who sold the lands to Frank and Harry Baldwin in 1917. After a failed ranching endeavor that introduced thousands of cattle to the islands, the Baldwins sold the lands to the Hawaiian Pineapple Company in 1922. The Hawaiian Pineapple Company continued cattle ranching alongside pineapple agriculture until 1951. During this time, the project area was located in ranch lands (Paddock 13). The final pineapple harvest on Lānaʻi occurred in November 1992.

The project area lies within Mānele Harbor, which was recognized by foreign arrivals as a key port location from the 1850s onward (Figure 43). A breakwater and boathouse were built in 1873. *Lele kawa* (cliff diving) was a favored activity in Mānele, especially from the cliffs on the southwest side of the coastline at Leinohaunui. In the 1920s, the Baldwin Ranch built a cattle chute near the Leinohaunui bluffs. Under the Hawaiian Pineapple Company, Mānele Landing was a popular hangout for plantation families. In the 1930s, mortar salt beds were added to the landing at Mānele, though they were moved to the cliffs above the landing in 1943.

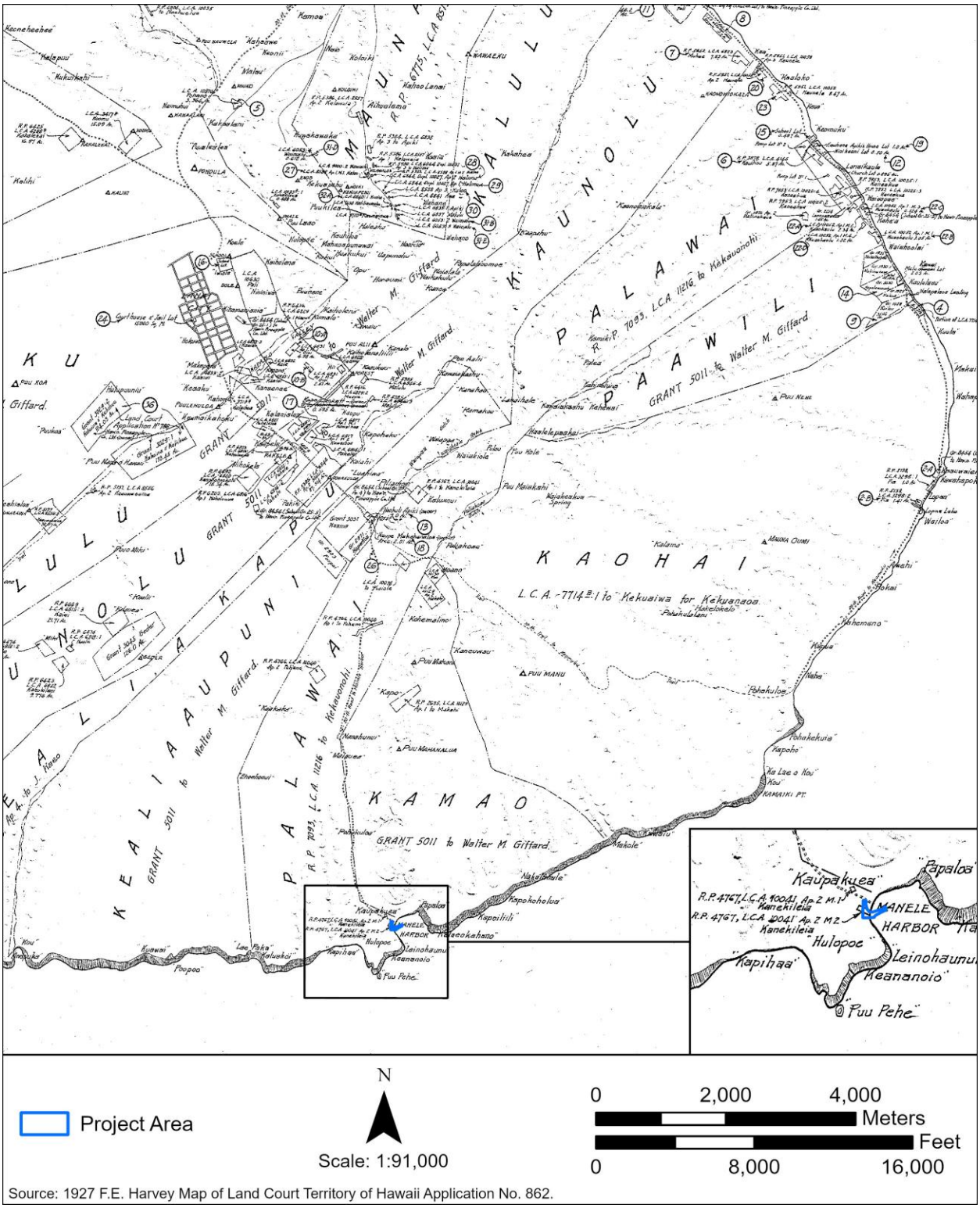


Figure 42. A 1927 map by F.E. Harvey showing the Lānaʻi portion of the HIFL project area within Pālāwai Ahupuaʻa, the locations of LCAs, and traditional place names in the vicinity of Mānele Harbor (see inset).



Figure 43. A 1941 photograph of the coastline around Mānele Harbor, titled "Puupehe, Lanai, T.H.," showing the largely unimproved landscape and the sand dunes connected Mānele Harbor (right) and Hulopoʻe Beach (left) (U.S. National Archives and Records Administration).

2.5.2 Previous Archaeology

A total of 14 archaeological studies have been conducted within 0.5 miles (0.8 km) of the Lānaʻi portion of the HIFL project area (Table 10 and Figure 44), resulting in the identification of 29 historic properties. The 29 previously identified historic properties within the 0.5-mile buffer are described in Table 11, which also contains significance assessments and mitigation recommendations. These historic properties are shown in Figure 45.

The historic properties identified in the vicinity of the project area reflect Mānele's intensive pre-Contact use as a village site and burial area. This includes a number of complexes that include pre-Contact habitation, agricultural, ceremonial, and burial sites. Post-Contact historic properties are mostly related to ranching activities and associated infrastructure, such as a boundary wall, well, roadway and trail complex, and a cattle chute and holding pen. Much of the surrounding area, including several burial sites, were significantly disturbed by bulldozing and other construction activities associated with the Mānele Small Boat Harbor Project in 1964-65. No historic properties have been identified previously within the Lānaʻi portion of the HIFL project area.

Table 10. Previous Archaeological Studies within 0.5 Miles of the Lānaʻi Portion of the HIFL Project Area

Reference	Type of Study	Findings
Emory 1924	Archaeological Survey	Conducted an island-wide survey of Lānaʻi. Two sites associated with the pre-Contact period were identified within 0.5 miles of the current project area: Puʻupehe platform (later assigned SIHP 50-40-98-00019) and the Mānele coastal habitation complex (no SIHP). No significance assessments or mitigation recommendations were made.
Soehren 1964	Archaeological Monitoring	Identified six historic properties, including two previously identified sites: Puʻupehe platform (Site A3-1, later assigned SIHP -00019) and a cist burial (Site A2-6, later assigned SIHP 50-40-98-00017). Four additional sites were newly recorded: a small house platform (Site A2-2; later assigned SIHP 50-40-98-00157), a small cist grave (Site A2-3; also designated as part of SIHP -00157), a rectangular enclosure (Site A2-4; designated as part of SIHP -00157), and several old platforms (Site A2-5; later assigned SIHP 50-40-98-00016). No significance assessments or mitigation recommendations were made.
Ching and Austin 1971	Archaeological Reconnais-sance	Identified 15 pre-Contact archaeological features (T-1 through T-15, no SIHP numbers assigned), all of which are within 0.5 miles of the project area. These included rock platforms (T-1, T-12, T-13), walls (T-2, T-3, T-6, T-7, T-9, T-11, and T-15), possible burial sites (T-4 and T-8), a possible shrine (T-5), and an enclosure (T-10). All features were assessed as not significant and recommended for no further work. Features T-7 through T-15 were destroyed by construction activity.
Bishop Museum 1974 (as cited in Maly 2020)	Site Inventory of Lānaʻi	Conducted an island-wide survey for the statewide inventory, with limited recordation of four sites within 0.5 miles of the current project area: SIHP -00016, platforms; 50-40-98-00085, a complex with 63 features; -00157, a complex with 4 features; and 50-40-98-01007, an old boiler and historic debris. The results of this survey relevant to Mānele Harbor are summarized in Maly (2020 Appendix A:8-9).
Sinoto 1978	Archaeological Reconnais-sance	No historic properties identified.

Reference	Type of Study	Findings
Kaschko and Athens 1987	Archaeological Inventory Survey	A total of 33 historic properties were identified, including 27 newly identified historic properties: SIHP 50-40-98-01500 through 50-40-98-01526; and six previously identified sites (SIHP -00016, -00019, 50-40-98-00078, -00085, and -00157, and -01007). Twenty-three of the newly identified sites and all six of the previously recorded sites are within 0.5 miles of the current project area, and represent a range of pre-Contact site types, burials, and one probable military feature. All 33 historic properties were assessed as significant under Criterion d. Additionally, SIHP -00019, -00078, -00085, -00157, and -01524 were assessed as significant under Criteria c and e, SHIP -01522, -01525, and -01526 under Criterion c and SIHP -01502, -01517 under Criterion e. All sites were recommended for data recovery, except SIHP -00019, which was recommended for preservation. SIHP -00016, -00078, -00085, -00157, -01522, -01524 through 01526, were also recommended for preservation.
Athens 1991	Data Recovery	Data recovery of two features associated with SIHP -00085. No significance assessments were made; SIHP -00085 was recommended for preservation.
Kaschko 1991a	Archaeological Inventory Survey	Recorded two previously identified historic properties: SIHP -01516 and -01517, both of which are located within 0.5 miles of the current project area. No significance assessments were made; both sites were recommended for data recovery.
Kaschko 1991b	Archaeological Inventory Survey	Recorded four previously identified historic properties: SIHP -01519, -01521, -01522, and -01523, all of which are located within 0.5 miles of the current project area. All four sites were recommended for data recovery. No significance assessments were made.
Athens et al. 1992 (Draft)	Archaeological Investigation	Detailed mapping and data recovery for eight previously identified historic properties: SIHP -00085, -01506, -01507, -01508, -01511, -01513, and -01514). All sites, except SIHP -01511, are within 0.5 miles of the current project area.
Athens et al. 2000a, Athens et al. 2000b, Tomonari-Tuggle et al. 2000	Data Recovery	Conducted data recovery and published three volumes in the area previously surveyed by Kaschko and Athens 1987. Recorded six previously identified historic properties, four of which are located within 0.5 miles of the current project area: SIHP -00085, -01506, -01508, and -01514) Subsurface testing added four additional features to SIHP -00085. No significance assessments or recommendations were made.
Berrigan et al. 2008	Archaeological Monitoring	Documented four new subsurface hearth features and one posthole during archaeological monitoring. Two hearth features and a posthole were added to the previously identified SIHP -01523, and two hearth features were added to the previously identified SIHP -01525. The study made a general recommendation for archaeological monitoring of all ground-disturbing activities within and adjacent to the Mānele Bay sites, as well as data recovery. The western terrace of SIHP -01523 was recommended for preservation.
Dye et al. 2013	Archaeological Inventory Survey Addendum	Addendum to AIS by (Kaschko and Athens 1987). New features were identified for three sites: SIHP -00157 Feature EE, an amorphous mound of basalt cobbles; SIHP -1524 Feature O, a grinding basin, and Feature P, a modified dike outcrop likely quarried for adze-quality rock; SIHP -01525 Features G, a partially collapsed rock alignment, Feature H, a three-sided terrace, and Feature I, a collapsed C-shaped enclosure.

Reference	Type of Study	Findings
Lee-Greig and Hammatt 2013	Archaeological Inventory Survey	Relocated five previously identified historic properties (SIHP -00085, -01007, -01513, -01515, and -01526) and added six new features to SIHP -00085 (Feature FFF, an agricultural mound; Feature GGG, an temporary habitation enclosure; Features HHH and KKK, agricultural terrace ; Feature III, a possible planting pit; and Feature JJJ, an indeterminate terrace) and one new feature to SIHP -01515 (Feature B, a temporary habitation terrace). SIHP -01508 was not relocated and was presumed to have been destroyed during previous construction activities. All five remaining sites were assessed as significant under Criterion d. Additionally, SIHP -00085 was assessed as significant under Criteria c and e, and SIHP -01526 under Criterion c. SIHP -00085, -01513, -01515, and -01526 were recommended for preservation and SIHP -01007 for data recovery with preservation commitments.

Note: Previous studies that include the current project area are highlighted in gray.

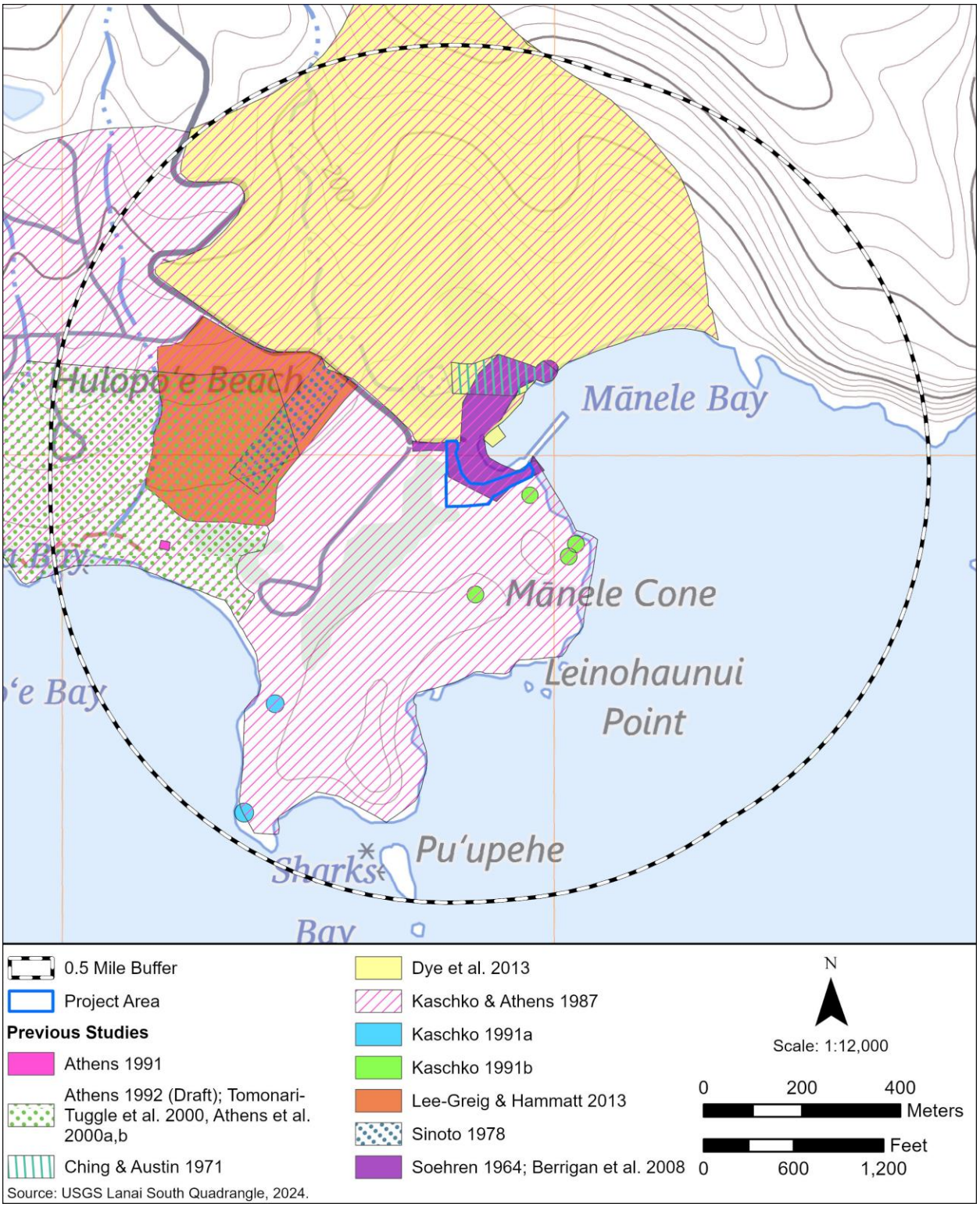


Figure 44. Previous archaeological studies within 0.5 miles of the Lānaʻi portion of the HIFL project area.

Table 11. Previously Identified Historic Properties Within 0.5 Miles of the Lānaʻi Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
50-40-98-00016	Complex of 4 features (platform and terraces)	Possible burial complex	Pre-Contact	d, e	Data Recovery (Kaschko and Athens 1987); Burial Treatment Plan/ Preservation (Dye et a. 2013)	Soehren 1964; Bishop Museum 1974 (as cited in Maly 2020), Kaschko and Athens 1987; Dye et al. 2013
50-40-98-00019	Platform	Possible bird hunter's shrine	Pre-Contact	c, d, e	Preservation (Kaschko and Athens 1987)	Emory 1924; Soehren 1964; Kaschko and Athens 1987
50-40-98-00078	Complex of 12 features (terraces, enclosures)	Habitation, ceremonial, burial	Pre-Contact	c, d, e	Preservation/ Data Recovery (Kaschko and Athens 1987); Burial Treatment Plan/ Preservation (Dye et al. 2013)	Bishop Museum 1974 (as cited in Maly 2020); Kaschko and Athens 1987; Dye et al. 2013
50-40-98-00085	Complex of 63 features (enclosures, terraces, C-shapes, L-shapes, cairns, platforms, rock shelters, wall, mound, possible planting pits)	Habitation, burial, agricultural	Pre-Contact	c, d, e	Preservation/ Data Recovery (Kaschko and Athens 1987); *in situ* Preservation (Athens 1991); Preservation (Athens et al. 1992, Lee-Greig and Hammatt 2013)	Bishop Museum 1974 (as cited in Maly 2020); Kaschko and Athens 1987; Athens 1991; Athens et al. 1992; Tomonari-Tuggle et al. 2000; Lee-Greig and Hammatt 2013
50-40-98-00157	Complex of 30 features (terraces, enclosures, platforms, C-shapes, cist, pavement)	Habitation, ceremonial, burial	Pre-Contact	c, d, e	Preservation/ Data Recovery (Kaschko and Athens 1987); Burial Treatment Plan/ Preservation (Dye et al. 2013)	Emory 1924; Soehren 1964; Ching and Austin 1971; Bishop Museum 1974 (as cited in Maly 2020); Kaschko and Athens 1987; Dye et al. 2013

Site Number	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
50-40-98-01007	Old boiler and historic debris	Cultural material area	Post-Contact	d	Data Recovery (Kaschko and Athens 1987); Data Recovery/ Preservation (Lee-Greig and Hammatt 2013)	Bishop Museum 1974 (as cited in Maly 2020); Kaschko and Athens 1987; Lee-Greig and Hammatt 2013
50-40-98-01500	Historic wall	Boundary	Post-Contact	d	Data Recovery	Kaschko and Athens 1987; Dye et al. 2013
50-40-98-01502	Small complex	Possible burial, indeterminate	Pre-Contact or Post-Contact	d, e	Data Recovery (Kaschko and Athens 1987); Burial Treatment Plan/ Preservation (Dye et al 2013)	Kaschko and Athens 1987; Dye et al. 2013
50-40-98-01503	Two C-shapes	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Dye et al. 2013
50-40-98-01504	Complex of 2 features (2 cairns, rock shelter)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Dye et al. 2013
50-40-98-01505	Complex of 6 features (terraces, C-shapes)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Dye et al. 2013
50-40-98-01506	Two adjacent, "cupboard" features	Storage	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Athens et al. 1992; Tomonari-Tuggle et al. 2000
50-40-98-01508	Terrace with basalt flake scatter	Habitation	Pre-Contact	d	Data Recovery (Kaschko and Athens 1987); Destroyed, No Further Work (Lee-	Kaschko and Athens 1987; Athens et al. 1992; Tomonari-Tuggle et al. 2000; Lee-Greig and Hammatt 2013

Site Number	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
					Greig and Hammatt 2013)	
50-40-98-01509	Complex of 4 features (C-shapes, enclosures)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987
50-40-98-01512	Well	Water procurement	Post-Contact	d	Data Recovery	Kaschko and Athens 1987
50-40-98-01513	Complex (terrace, C-shapes, cairn)	Temporary Habitation, Marker	Pre-Contact	d	Data Recovery (Kaschko and Athens 1987); Preservation (Lee-Greig and Hammatt 2013)	Kaschko and Athens 1987; Lee-Greig and Hammatt 2013
50-40-98-01514	Complex of 3 features (walls, enclosure)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Athens et al. 1992; Tomonari-Tuggle et al. 2000
50-40-98-01515	Rectangular walled structure	Habitation	Pre-Contact	d	Data Recovery (Kaschko and Athens 1987); Preservation (Lee-Greig and Hammatt 2013)	Kaschko and Athens 1987; Lee-Greig and Hammatt 2013
50-40-98-01516	Subsurface cultural deposit	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Kaschko 1991a
50-40-98-01517	Complex of 2 features (2 cairns, midden)	Ceremonial, habitation	Pre-Contact	d, e	Data Recovery	Kaschko and Athens 1987; Kaschko 1991a
50-40-98-01518	Complex of 3 features (petroglyph, pit, concentration of coral pebbles)	Art, military	Pre-Contact and post-Contact	d	Data Recovery	Kaschko and Athens 1987

Site Number	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
50-40-98-01519	Complex of 3 features (terraces)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Kaschko 1991b
50-40-98-01520	Complex of 3 features (rock shelters, midden)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987
50-40-98-01521	Paved area with midden scatter	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Kaschko 1991b
50-40-98-01522	Cattle chute and holding pen	Animal husbandry	Post-Contact	c, d	Preservation/Data Recovery (Kaschko and Athens 1987); Data Recovery (Kaschko 1991b)	Kaschko and Athens 1987; Kaschko 1991b
50-40-98-01523	Complex of 6 features (terrace, rock shelter, coral pebble/cobble concentration, concrete floor foundations, core-filled wall segment)	Habitation	Pre-Contact and post-Contact	d	Data Recovery (Kaschko and Athens 1987); Data Recovery (Kaschko 1991b); Preserved (Berrigan et al. 2008)	Kaschko and Athens 1987; Kaschko 1991b; Berrigan et al. 2008
50-40-98-01524	Mauka-makai ridgetop trail with associated shelter features (terraces, C-shapes, rock shelters, enclosure, platform)	Transportation, habitation, burial	Pre-Contact	c, d, e	Preservation/Data Recovery (Kaschko and Athens 1987); Burial Treatment Plan/ Preservation (Dye et al. 2013)	Kaschko and Athens 1987; Dye et al. 2013

Site Number	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
50-40-98-01525	Complex of 6 features (enclosures, terrace)	Habitation	Pre-Contact	c, d	Preservation/Data Recovery (Kaschko and Athens 1987); Monitoring/ Data Recovery (Berrigan et al. 2008); Preservation (Dye et al. 2013)	Kaschko and Athens 1987; Berrigan et al. 2008; Dye et al. 2013
50-40-98-01526	Complex of roadways and trails	Transportation	Post-Contact	c, d	Preservation/Data Recovery (Kaschko and Athens 1987); Data Recovery (Dye et al 2013); Preservation (Lee-Greig and Hammatt 2013)	Kaschko and Athens 1987; Dye et al. 2013; Lee-Greig and Hammatt 2013

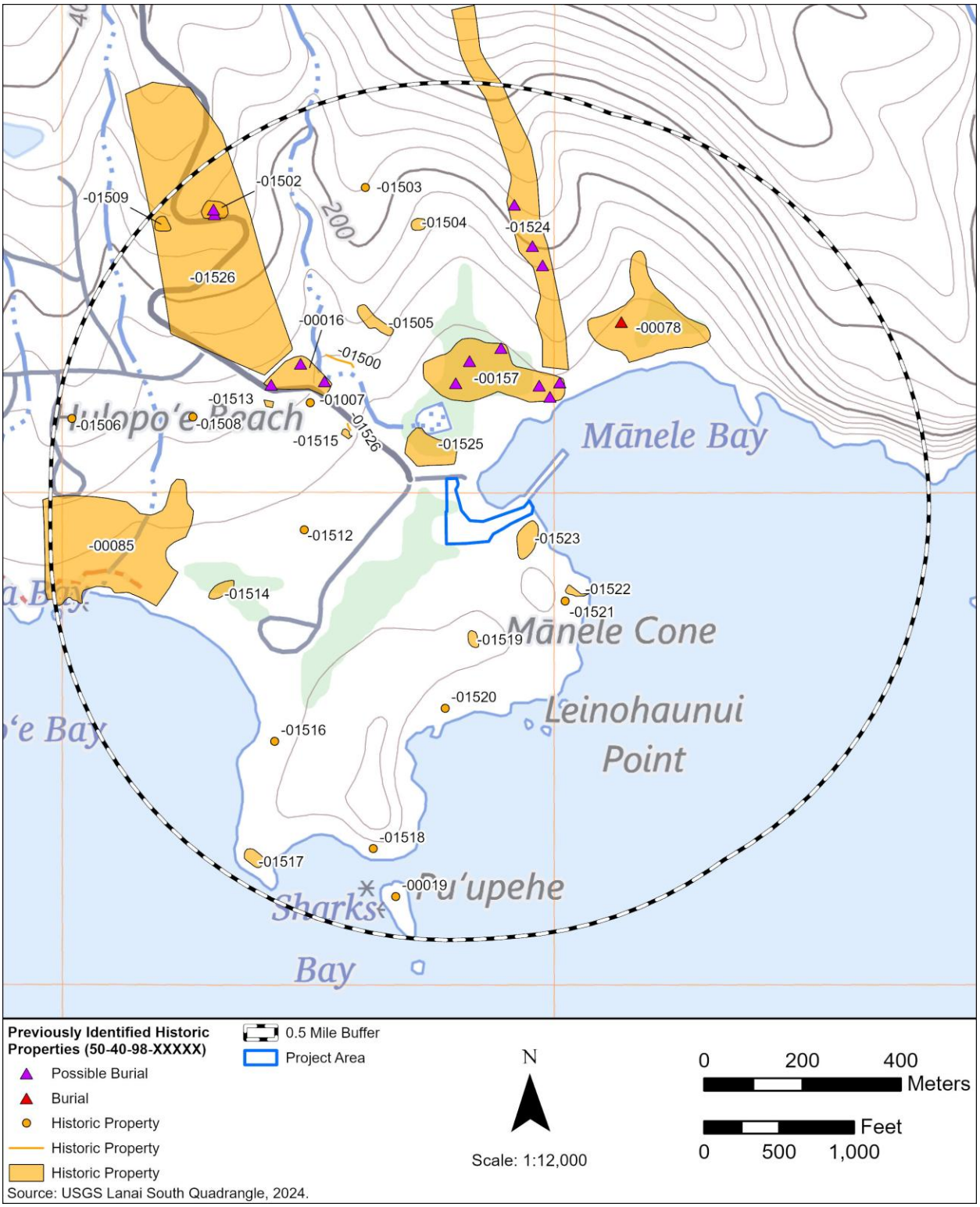


Figure 45. Previously identified historic properties within 0.5 miles of the Lānaʻi portion of the HIFL project area.

2.6 HAWAIʻI CABLE LANDING SITE

2.6.1 Archival Research Summary

The Hawaiʻi Island portions of the HIFL project area are located within the traditional *moku* of Hilo within the *ahupuaʻa* of Waiākea. As Waiākea Ahupuaʻa is a large and much-storied place, the current report places an emphasis on the areas around Hilo Bay, Keaukaha, and the UH Hilo campus. This portion of the HIFL subsea cable will come onshore at Puhi Bay, in an area traditionally known as Milo or Puuhomilo. Several *moʻolelo* are connected with this area in particular. One discusses the supernatural *heʻe* (octopus; Octopoda) that dwelled at Milo, who would occasionally take one of the children who went to Puhi Bay to swim. Several other stories are tied to the well-known shark hole at Puhi Bay, and the shark *ʻaumakua* (family god, deified ancestor) that would protect those waters and the people of Keaukaha.

Hilo is well known for its frequent rains, which support ample freshwater sources and lush vegetation. Boundary Commission Testimonies make frequent reference to streams, grottos, waterholes, house sites, and cultivation plots with a wide variety of plants under cultivation, including taro, yams, bananas, ti, coconuts, and *māmaki* (*Pipturus albidus*). In areas where *kalo* could not be planted in *loʻi*, the *kipi* method of *kalo* planting was used, or *kalo huli* were submerged in water and held upright by lava rock mounds. Hilo was also a major area for *ʻulu* (breadfruit; *Artocarpus altilis*) planting, which is further reflected by the *moʻolelo* of ʻUlu and Mokuola.

Fishing is also an integral part of life in Hilo Bay, with a wide variety of fishing methods practiced as well as cultivation of fish in ponds, and gathering shellfish, marine invertebrates, and *limu* (seaweed). At least three different types of *limu* were available in the bay: *limu ʻeleʻele* (*Codium edule*), *limu huluhuluwaena* (*Grateloupia filicina*), and *limu ʻakiʻaki* (*Gymnogongrus durvillei*). Fishponds supplied ʻ*amaʻama* (mullet; *Mugil cephalus*), *awa* (milkfish; *Chanos chanos*), *ahole* (flagtail; *Kuhlia* sp.), and ʻ*oʻopu* (Hawaiian freshwater goby; *Lentipes concolor*). During the Kamehameha Dynasty, some of the fishponds in Waiākea were known as the "Royal Ponds," and supplied mullet reserved for the King (Figure 46). Fishpond ecosystems also supported avifaunal species that are no longer found in the bay, including the endemic Hawaiian duck (*koloa-maoli*; *Anas wyvilliana*), coot (*ʻalae*; *Fulica alai*), and stilt (*kukuluāeʻo*; *Himantopus himantopus*), and migratory pintail, widgeon, and shoveler ducks.

Hilo figured prominently during the Kamehameha Dynasty. Kamehameha was living in Hilo in 1794 when Vancouver visited, and later Kamehameha identified Hilo Bay as a favorable place for mounting his attack on Kauaʻi, given the availability of adzes from Mauna Kea, *koa* (*Acacia koa*) and *ʻolonā* (*Touchardia latifolia*) in the inland forests, and ample space to stage his fleet. On Kamehameha I's passing, Waiākea Ahupuaʻa was inherited by Liholiho (Kamehameha II). After Liholiho and Kamāmalu contracted measles in England and passed away within days of each other, they were returned to Hilo Bay by Captain Byron of the HMS *Blonde*. The lands of Waiākea were held by Kaunuohua, granddaughter to Keawemauhili, at the time of the Mahele, and the *ahupuaʻa* became Crown Lands. Although there are a number of LCA awards in the coastal region of Waiākea Ahupuaʻa, none are located near the portions of the HIFL project area.

Sugarcane cultivation and processing was a booming industry in Hilo following the Mahele, and drove much of the commercial, industrial, and infrastructural developments of the late nineteenth and early twentieth century (Figure 47). The portion of the project area at UH Hilo is in land that was formerly under sugarcane cultivation for the Waiākea Mill Company, which operated from

1879 to 1947. The need to transport sugar from the fields to mills for processing, and from the mills to the harbor for overseas shipping, drove the development of the Hilo Railroad and infrastructural improvements in Hilo's harbors. In 1955, these former cane lots became a part of UH Hilo's permanent campus.

The PACRC portion of the HIFL project area is in land that was set aside for the Keaukaha Beach Park by Executive Order 421, during the passage of the Hawaiian Homes Commission Act in 1920. In 1924, the Keaukaha-Panaewa Hawaiian Home Lands followed the Hoolehua and Palaau Homesteads on Molokai to become one of the first Hawaiian Homesteads established. Hawaiian families were living in this area prior to the establishment of the homesteads, and oral historical interviews conducted by Rhea Akoi (1989)document some of what it was like to live in Keaukaha before and after the establishment of the Keaukaha-Panaewa Hawaiian Home Lands. People recalled living on resources from the ocean and the crops grown in their gardens. Keaukaha became a thriving community, and many of the historic properties in the vicinity of the project area are architectural resources related to this community, including Kamehameha Hall and Kawananakoa Hall, which was completed in 1938 and originally located just to the east of the PACRC portion of the project area. This structure was destroyed during the 1946 tidal wave, and the location of the hall was moved to Baker Street.

In 1966, the Hilo Sewage Treatment Plant was built in the current location of the PACRC facilities. The outfall for the Hilo Sewage Treatment Plant was installed at Puhi Bay, near the breakwater and the PACRC portion of the HIFL project area. Initially, the outfall discharged effluent at a depth of roughly 37 feet. A few years later, this was extended to 4,500 feet offshore and discharged at a depth of 56 feet. The plant significantly reduced the amount of pollutants entering the Hilo Harbor waters, though the waters at Puhi Bay continued to receive the majority of pollutants. In 1993, a new wastewater treatment facility was built near the airport, rendering the treatment plant at Puhi Bay obsolete. In 1998, UH Hilo proposed redeveloping the Old Hilo Wastewater Treatment Plant into the Pacific Aquaculture and Coastal Resources Center. Work on the PACRC began in 2000, and facilities opened in 2005.

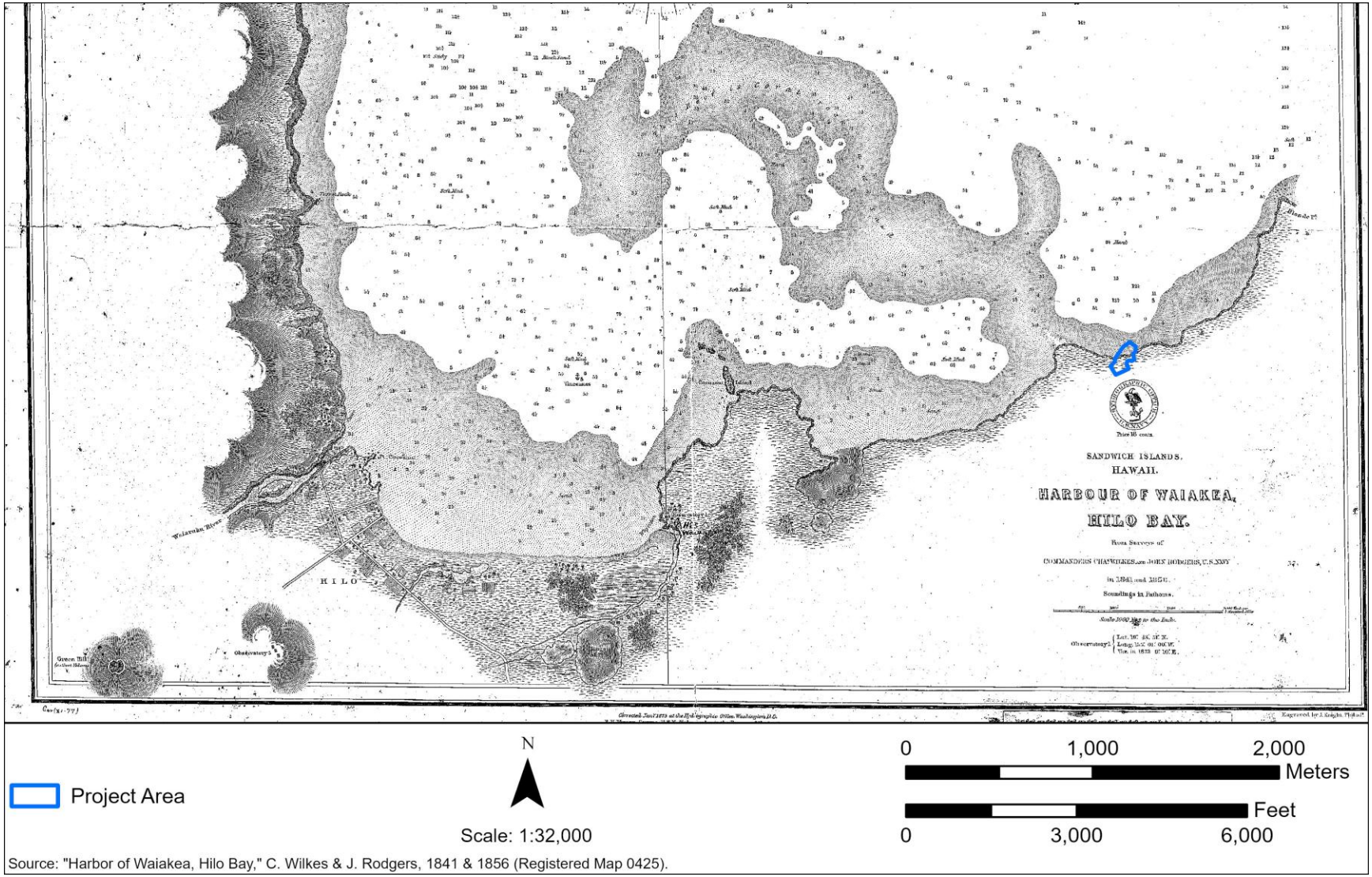


Figure 46. 1841 and 1856 map by Charles Wilkes showing Waiākea Harbor relative to the PACRC portion of the HIFL project area

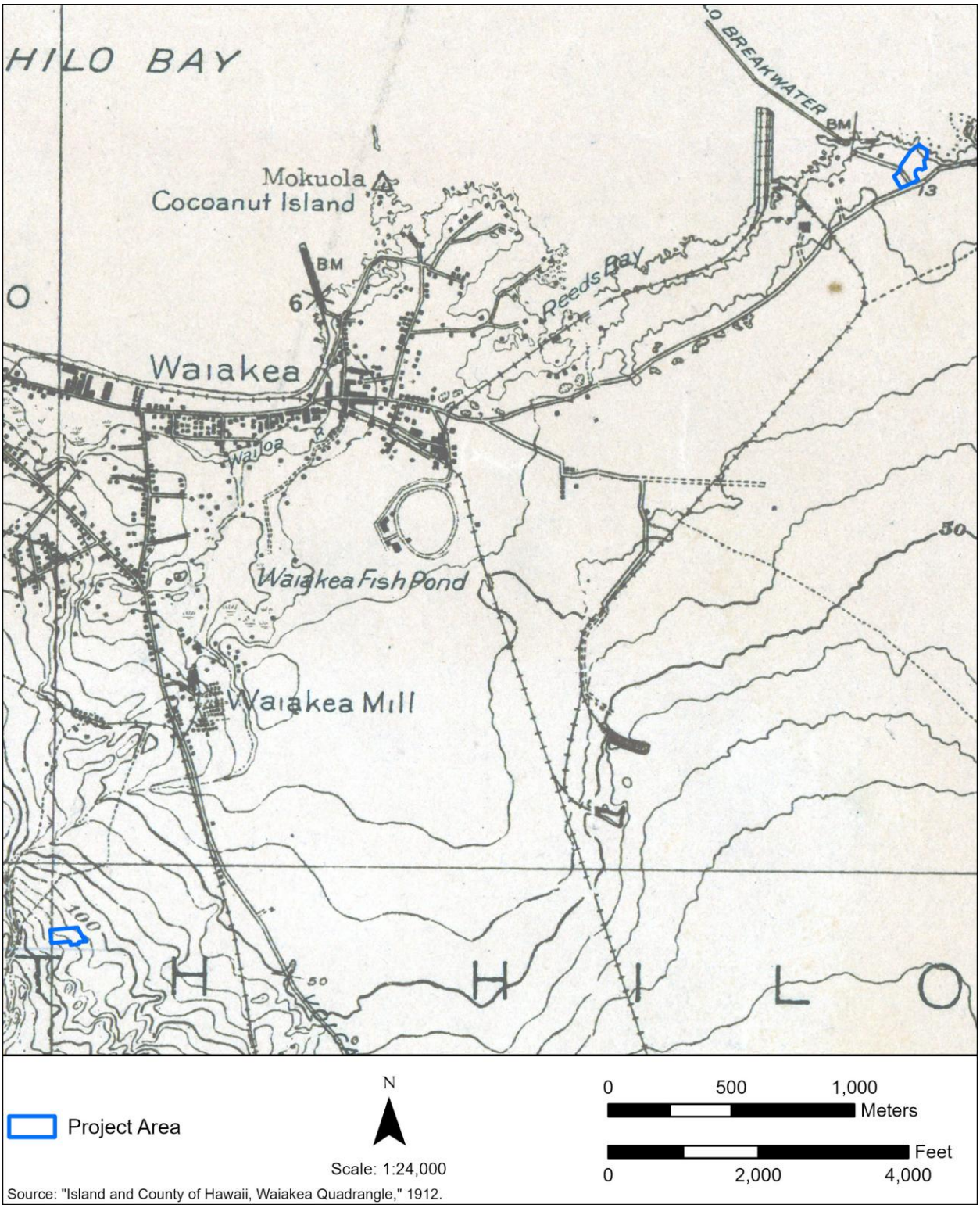


Figure 47. A 1912 topographic map by Donn showing sugarcane related development, including Waiakea Mill, Hilo Sugar Co. Mill, and the Hilo Railroad which transported milled sugar to the harbor.

2.6.2 Previous Archaeology

A total of 15 archaeological studies have been conducted within 0.5 miles (0.8 km) of the Hawai‘i Island portions of the HIFL project area, resulting in the identification of a total of 41 historic properties. Archaeological investigations specific to the PACRC portion of the project area are presented in Table 12 and shown in Figure 48, while those for the UH Hilo portion of the project area are presented in Table 13 and shown in Figure 49. Collectively, Table 12 and Table 13 provide an overview of all 15 archaeological investigations with a summary of their findings. All previously identified historic properties within the 0.5-mile buffer around the project area are described in Table 14 (PACRC portion) and Table 15 (UH Hilo portion), which also contains significance assessments and mitigation recommendations. These historic properties are presented in Figure 50 (PACRC portion) and Figure 51 (UH Hilo portion).

Eight historic properties were identified in the vicinity of the HIFL project area at PACRC (Figure 50 and Table 14). All eight of these properties are architectural features associated with post-Contact development of Hilo and Keaukaha. They include the Hilo Breakwater, Hilo Harbor, Hilo Railroad Company tracks, Peter Arioli House, Kahauolupua House, St. Mary’s Gate of Heaven Church, Kuhio Memorial Chapel, and Kamehameha Hall. No previously identified historic properties are within this portion of the project area.

A total of 33 historic properties have been identified in the vicinity of the portion of the HIFL project area at UH Hilo (Figure 51 and Table 15). Identified historic properties were largely features associated with post-Contact agricultural activities, and included platforms, mounds, modified outcrops, linear walls, pit features, enclosures, and drainage features. The majority of these features are associated with sugarcane cultivation by the Waiakea Mill Company, as well as the Hilo Dairy Facilities. No historic properties were previously identified within this portion of the project area.

Table 12. Previous Archaeological Studies Within 0.5 Miles of the PACRC Portion of the HIFL Project Area

Reference	Type of Study	Findings
Rosendahl 1988	Archaeological Reconnaissance	No historic properties identified.
Haun and Henry 2000	Archaeological Inventory Survey	Identified one historic property with four features. None are located within 0.5 miles of the project area.
Rechtman 2009	Archaeological Inventory Survey	No historic properties were identified, and an archaeological assessment report was submitted to SHPD.
Barna and Kepa‘a 2023	Archaeological Monitoring	Identified one new historic property (T-1; no SIHP number assigned) and one previously identified historic property: SIHP 50-10-35-07413, the Hilo Railroad track (Wolforth 2004, 2006) during archaeological monitoring. Only SIHP -07413, the Hilo Railroad track, is located within 0.5 miles of the current project area. The site was previously assessed as significant under Criterion d and recommended for no further work. However, Barna and Kepa‘a (2023) recommended that future projects document the remaining portions of the tracks not included in their project area.

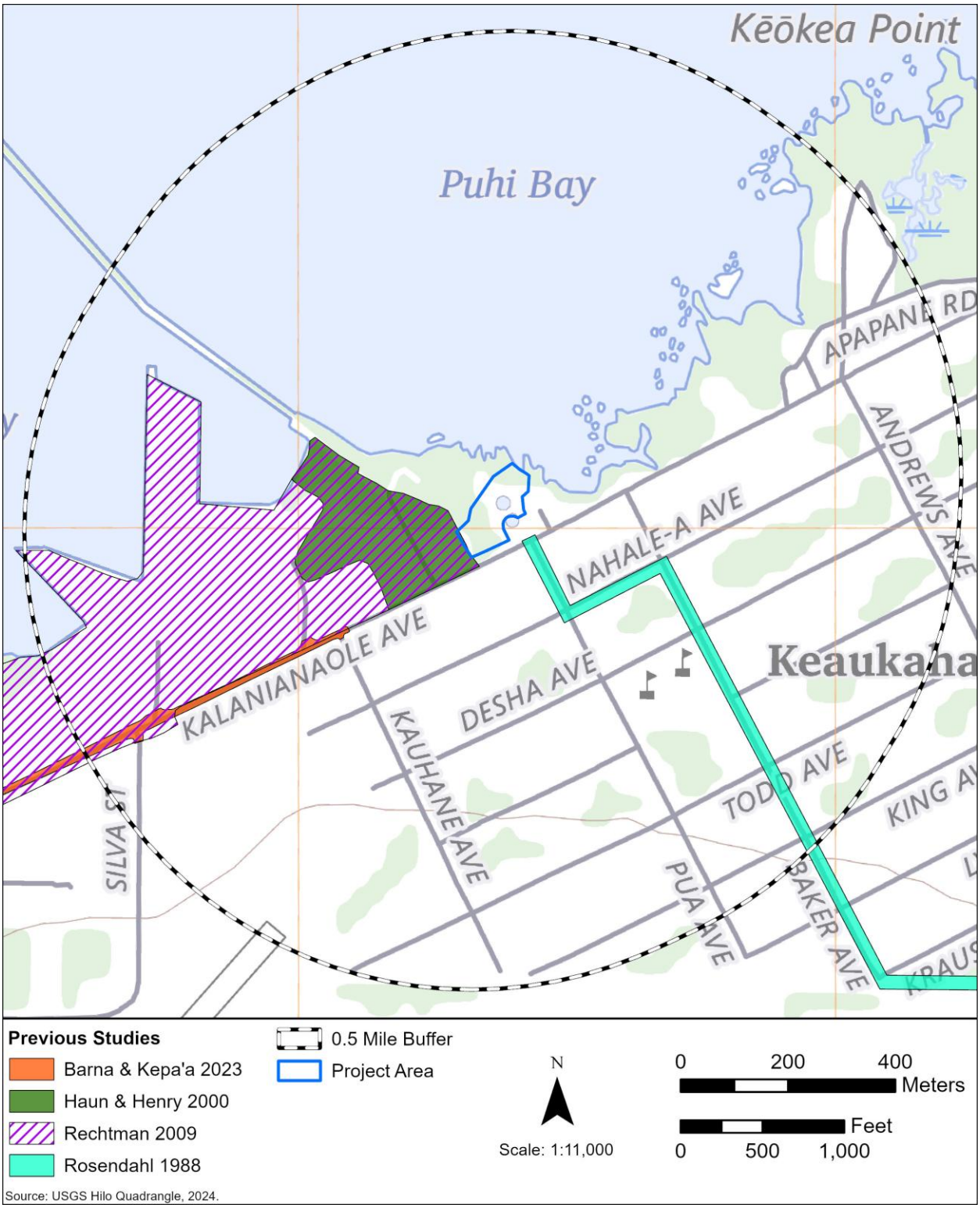


Figure 48. Previous archaeological studies conducted within 0.5 miles of the PACRC portion of the HIFL project area.

Table 13. Previous Archaeological Studies Within 0.5 Miles of the UH Hilo Portion of the HIFL Project Area

Reference	Type of Study	Findings
Borthwick et al. 1993	Archaeological Inventory Survey	Identified four new historic properties associated with post-Contact sugarcane agriculture: SIHP 50-10-35-18667 through 50-10-35-18670, all of which are located within 0.5 miles of the current project area. The sites include an agricultural complex containing two walls and approximately 25 mounds (SIHP -18667); an oval enclosure and adjacent L-shaped wall segment (SIHP -18668); modified outcrop enclosure and wall segment (SIHP -18669); and remnant of a sugar cane field (SIHP -18670). All four sites were assessed as significant under Criterion d and recommended for no further work.
Hunt and McDermott 1994	Archaeological Inventory Survey	Identified a total of 13 historic properties None are located within 0.5 miles of the project area.
Maly et al. 1994	Archaeological Inventory Survey	Identified four new historic properties within 0.5 miles of the current project area: SIHP 50-10-35-19431 through 50-10-35-19434, associated with post-Contact agriculture and habitation. These included two agriculture/habitation enclosure features (SIHP -19431); a complex of 47 wall and mound features (SIHP -19432); a possible temporary C-shaped habitation (SIHP -19433); and free-standing U-shaped wall (SIHP -19434). All four sites were assessed as significant under PHRI category A and recommended for data recovery.
Spear 1995	Data Recovery	Data recovery investigations for the four historic properties identified by Maly et al. 1994; SIHP -19431 through 50-19434. Following data recovery, no further work was recommended.
Robins and Spear 1996	Archaeological Inventory Survey	Identified one new agricultural historic property and added features to three historic properties previously documented by Hunt and McDermott (1994). None are within 0.5 miles of the project area.
Rechtman and Henry 1998	Archaeological Inventory Survey	Identified one new historic property within 0.5 miles of the project area: SIHP 50-10-35-21461, which is associated with post-Contact agriculture and included a total of 117 features consisting of walls, mounds, and enclosures. It was assessed as significant under Criterion d and recommended for no further work.
McGerty and Spear 1999	Archaeological Inventory Survey	Added 13 new features to SIHP -19432. New features included rock walls, mounds, and platforms, and are all located within 0.5 miles of the current project area. The features were considered no longer significant as sufficient data had been collected, and no further work was recommended.
Wilkinson et al. 2010	Archaeological Monitoring	No historic properties identified.

Reference	Type of Study	Findings
Clark et al. 2012	Archaeological Inventory Survey	Identified four new historic properties within 0.5 miles of the current project area: SIHP 50-10-35-29370 through 50-10-35-29373, which are associated with flood control for the Waiākea Stream and sugarcane cultivation for the Waiākea Sugar Company/Hilo Dairy. These included two drainage sites (SIHP -29370 and -29371), an agriculture mound (SIHP -29372), and remnants of the Hilo Dairy (SIHP -29373). All four sites were assessed as significant under Criterion d and recommended for no further work.
Escott 2013	Archaeological Inventory Survey	Recorded a total of 18 newly identified historic properties and one previously identified historic property (remnants of the Hilo Dairy; SIHP -29373) within 0.5 miles of the project area. Newly identified historic properties included modified outcrops (SIHP 50-10-35-29965, 50-10-35-29966, 50-10-35-29969, 50-10-35-29976, 50-10-35-29974, 50-10-35-29976, 50-10-35-29978, 50-10-35-29979, 50-10-35-29980, 50-10-35-29981), rock mounds and piles (50-10-35-29968, 50-10-35-29970, 50-10-35-29971, 50-10-35-29976, 50-10-35-29974, 50-10-35-29975, 50-10-35-29978), platform sites (50-10-35-29979, 50-10-35-29981), rock and linear walls (SIHP 50-10-35-29967, 50-10-35-29972, 50-10-35-29978, 50-10-35-29980), agricultural complexes with terraces, paving, and water-retaining features (SIHP 50-10-35-29978, 50-10-35-29980), boundary features (SIHP 50-10-35-29972, 50-10-35-29977), and a pit feature (SIHP 50-10-35-29982). Five additional features were also added to SIHP -29373 (a multi-room building, foundation of a former barn, small concrete slab, concrete retaining wall, and pile of waterworn rock; Features F through J, respectively). All newly identified sites and features were assessed as significant under Criterion d and recommended for no further work.
Nelson et al. 2017	Archaeological Monitoring	Added one feature (Feature F, a cesspool) to SIHP -29373, remnants of the Hilo Dairy. The feature was assessed as significant under Criterion d and recommended for no further work.

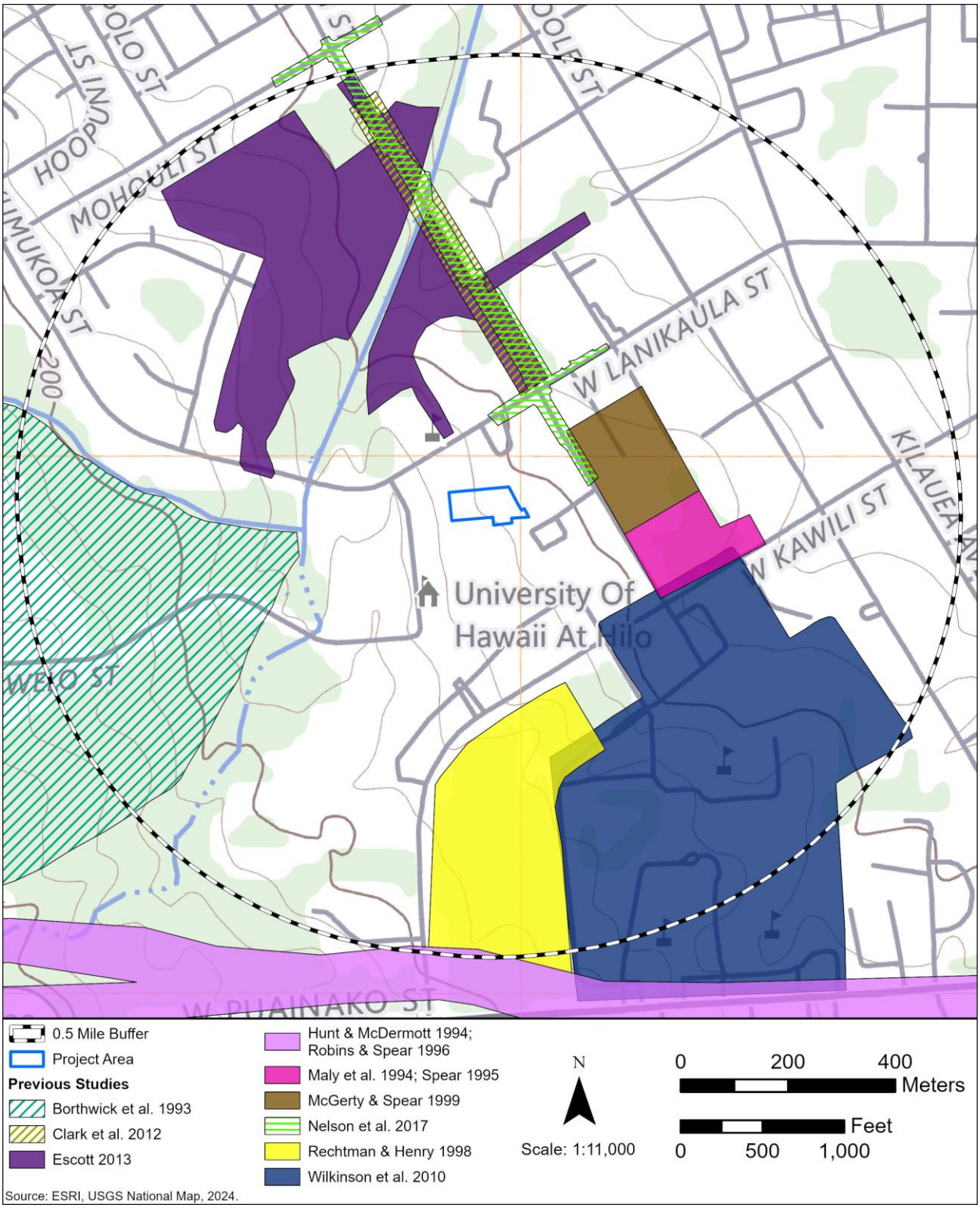


Figure 49. Previous archaeological studies conducted within 0.5 miles of the UH Hilo portion of the HIFL project area.

Table 14. Previously Identified Historic Properties Within 0.5 Miles of the PACRC Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-10-35-07413	Hilo Railroad Company tracks	Transportation	Post-Contact	-	d	-	No Further Work/ Documentation during future projects	Barna and Kepa'a 2023
50-10-35-07430	Peter Arioli House	Permanent Habitation	Post-Contact	-	-	-	None provided	On File, SHPD
50-10-35-07431	Kahauolopua House	Permanent Habitation	Post-Contact	-	-	-	None provided	On file, SHPD
50-10-35-07437	St. Mary's Gate of Heaven Church	Ceremonial	Post-Contact	-	-	-	None provided	On File, SHPD
50-10-35-07438	Kuhio Memorial Chapel	Ceremonial	Post-Contact	-	-	-	None provided	On File, SHPD
50-10-35-07441	Hilo breakwater	Surf control	1929–1930	-	a, c	-	Preservation	Department of Land and Natural Resources (DLNR) 1974
50-10-35-07506	Kamehameha Hall	Commerce/Trade	Post-Contact	-	-	A, C	Preservation	Neves 1992
50-10-35-31077	DOT Hilo Harbors	Government Operations	Post-Contact	-	-	-	None provided	On File, SHPD

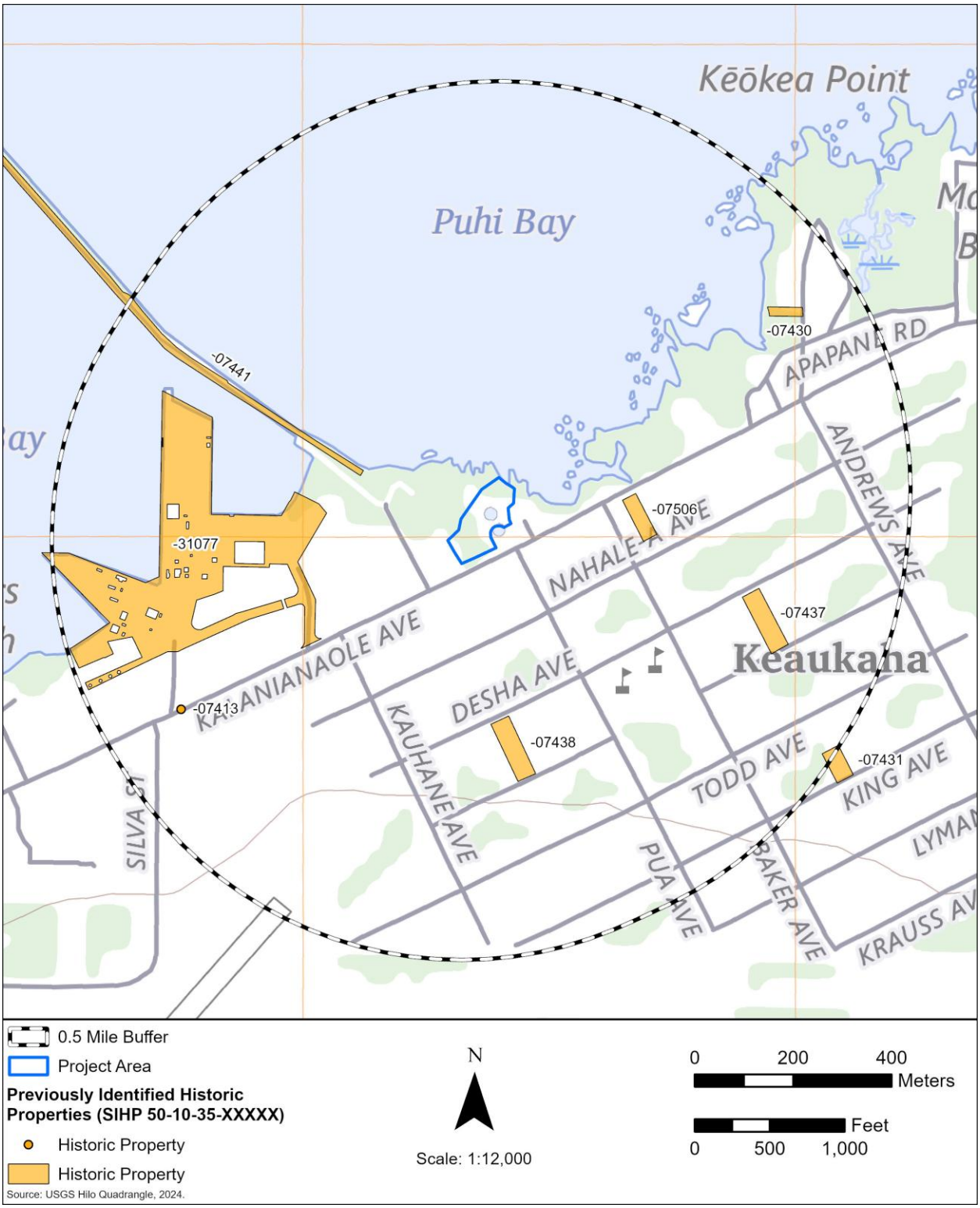


Figure 50. Previously identified historic properties within 0.5 miles of the PACRC portion of the HIFL project area.

Table 15. Previously Identified Historic Properties Within 0.5 Miles of the UH Hilo Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-10-35-18669	Enclosure and wall segment	Temporary habitation	Post-Contact	-	d	-	No Further Work	Borthwick et al. 1993
50-10-35-18670	Remnant commercial sugarcane field (Cane Lot #16) with numerous rock clearing features (mounds, piled rocks)	Agriculture	Post-Contact	-	d	-	No Further Work	Borthwick et al. 1993
50-10-35-19431	Complex (enclosure and C-shape)	Habitation; agriculture	Post-Contact	A	-	-	Data Recovery (Maly et al. 1994); No Further Work (Spear 1995)	Maly et al. 1994; Spear 1995
50-10-35-19432	Complex (at least 60 features: mounds, platforms, walls, and enclosures)	Agriculture; possible habitation	Pre-Contact	A	-	-	Data Recovery (Maly et al. 1994); No Further Work (Spear 1995, McGerty and Spear 1999)	Maly et al. 1994; Spear 1995; McGerty and Spear 1999
50-10-35-19433	C-shape enclosure	Temporary habitation	Post-Contact	A	-	-	Data Recovery (Maly et al. 1994); No Further Work (Spear 1995)	Maly et al. 1994; Spear 1995
50-10-35-19434	U-shaped wall	Temporary habitation	Post-Contact	A	-	-	Data Recovery (Maly et al. 1994); No Further Work (Spear 1995)	Maly et al. 1994; Spear 1995
50-10-35-21461	Complex of 117 features	Agriculture	Post-Contact	-	d	-	No Further Work	Rechtman and Henry 1998

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
	(walls, enclosures, and mounds)							
50-10-35-29370	Drainage features related to modifications of Waiākea Stream channel	Water control	Post-Contact	-	d	-	No Further Work	Clark et al. 2012
50-10-35-29371	Earthen ditch	Water control	Post-Contact	-	d	-	No Further Work	Clark et al. 2012
50-10-35-29372	Rock mound	Agriculture	Post-Contact	-	d	-	No Further Work	Clark et al. 2012
50-10-35-29373	Hilo Dairy facilities	Dairy	Post-Contact	-	d	-	No Further Work	Clark et al. 2012; Escott 2013; Nelson et al. 2017
50-10-35-29965	Modified outcrops and rock mound	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29966	Modified outcrop	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29967	Rock wall	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29968	Rock mounds	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29969	Rock mound	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29970	Rock wall	Agriculture	Post-Contact		d		No Further Work	Escott 2013
50-10-35-29971	Rock mounds	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29972	Rock wall	Boundary	Post-Contact		d		No Further Work	Escott 2013
50-10-35-29973	Rock mounds and modified outcrop	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29974	Rock mound and modified outcrop	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29975	Rock mound	Agriculture	Post- Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29976	Rock mounds	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-10-35-29977	Fence posts	Boundary	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29978	Complex of 17 features (modified outcrops, terrace, rock walls and mounds)	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29979	Platform and modified outcrops	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29980	Linear walls, modified outcrop, paving and water retaining feature	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29981	Platform and modified outcrop	Undetermined	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29982	Pit feature with partial fill	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013

- Rather than using Hawai'i Register of Historic Places significance criteria, PHRI assigned their own significance categories, defined as follows:

A=Important for information content, further data collection necessary (PHRI=research value);
X=Important information content, no further data collection necessary (PHRI=research value, DLNR-HPP=not significant);
B=Excellent example of site type at local, region, island, State, or National level (PHRI=interpretive value); and
C=Culturally significant (PHRI=cultural value).

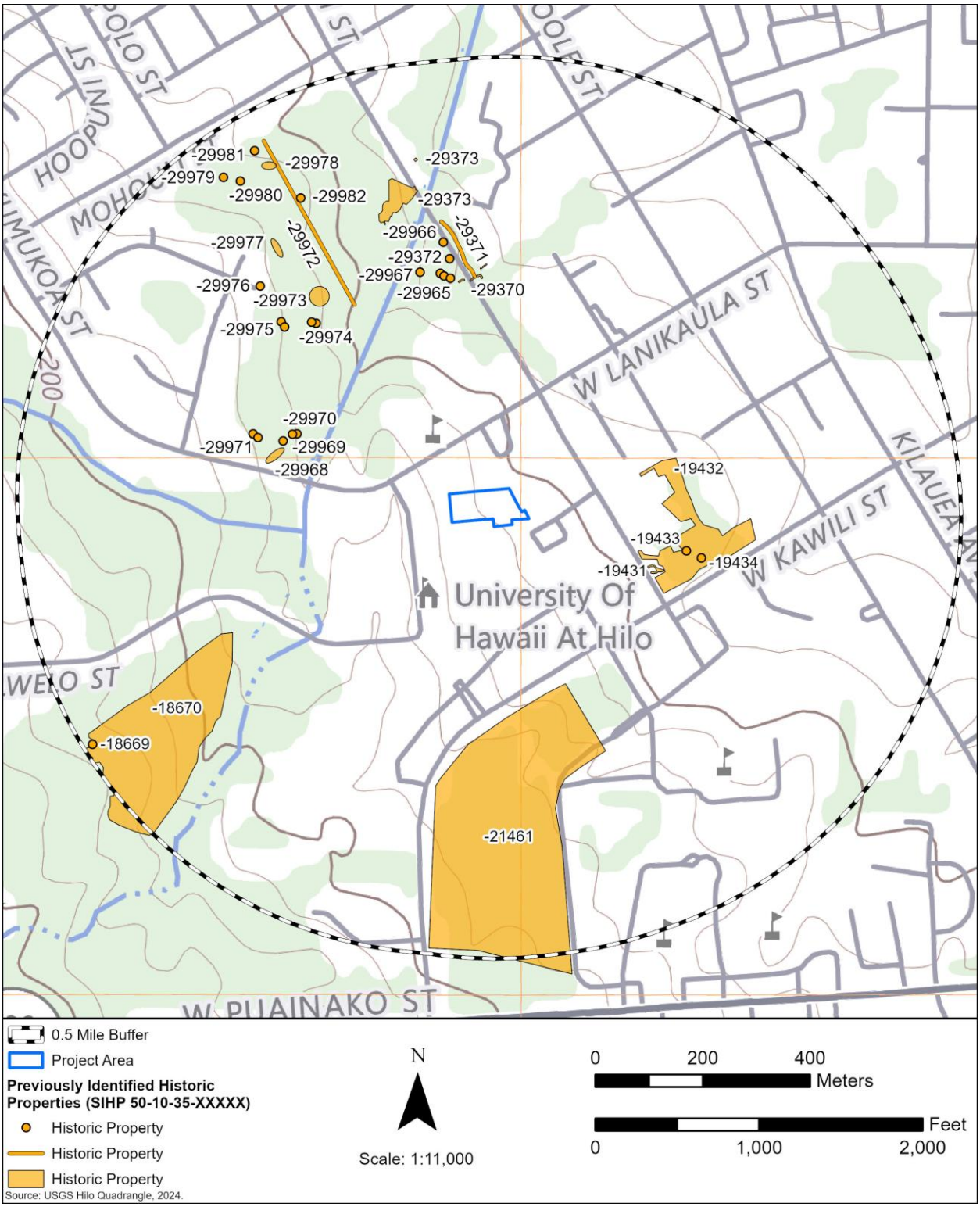


Figure 51. Previously identified historic properties within 0.5 miles of the UH Hilo portion of the HIFL project area.

3.0 RESULTS OF FIELD INSPECTION

Pacific Legacy, Inc. conducted field inspections for the proposed HIFL project over the course of six nonconsecutive days: February 6, 2025; February 12, 2025; February 20, 2025; March 5, 2025; March 6, 2025; and March 13, 2025. Field inspections were carried out by teams of two Pacific Legacy archaeologists under the overall supervision of Mara Mulrooney, Ph.D. (principal investigator). A total of 12 potential historic property features were identified within the HIFL project area, including one previously identified historic property and 11 newly identified historic property features (Table 16). The results for each cable landing site are detailed individually below.

Table 16. Potential Historic Properties Identified through the Literature Review and Field Inspection for the HIFL Project

Temp. Site No.	SIHP No.	Type	Possible Function	Probable Age	Cable Landing Site Location
N/A	50-30-08-02235	Ditch	Water control	Post-Contact	Nukoli‘i Beach
T-001	N/A	Concrete jetty	Transportation	Post-Contact	Nukoli‘i Beach
T-002	N/A	Grate/ditch	Water control	Post-Contact/Recent	Nukoli‘i Beach
T-003	N/A	Debris pile	Refuse	Post-Contact/Recent	Molokai Yacht Club
T-004	N/A	Concrete ditch	Water control	Post-Contact	Mānele Harbor
T-005	N/A	Stone wall	Soil retention	Post-Contact	Mānele Harbor
T-006	N/A	Circular and rectangular concrete tanks	Repurposed wastewater infrastructure	Post-Contact	PACRC Hilo
T-007	N/A	Circular and rectangular concrete tanks	Repurposed wastewater infrastructure	Post-Contact	PACRC Hilo
T-008	N/A	Metal and concrete pipe infrastructure	Wastewater treatment infrastructure	Post-Contact	PACRC Hilo
T-009	N/A	Concrete culvert	Water control	Post-Contact	PACRC Hilo
T-010	N/A	Wentworth Building	Education	1955	PACRC Hilo
T-011	N/A	Business Education and Technology Building	Education	1955	PACRC Hilo

3.1 KAUAʻI CABLE LANDING SITE

Pacific Legacy, Inc. conducted a field inspection of the proposed Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College on February 6, 2025. The inspection was conducted by Pacific Legacy archaeologists Jillian Swift, Ph.D. and Samara Albuquerque, B.A.

The field inspection confirmed the presence of one previously identified historic property and identified two new potential historic properties within the project area (Table 17, Figure 52 through Figure 58). Overview photographs of the Kauaʻi portion of the project area at Nukoliʻi Beach are presented in Figure 59 through Figure 61, and those of the Kauaʻi Community College portion are shown in Figure 62 and Figure 63. The previously identified historic property re-located within the project area is a post-Contact water control ditch (SIHP 50-30-08-02235) estimated to have been built in the early 1960s (Soltz et al. 2014). SIHP -02235 was assessed as significant under Criterion d and recommended for no further work. The two newly identified historic properties include a concrete jetty off the Nukoliʻi Beach shoreline (T-001) and a water control feature consisting of a metal drainage gate and small drainage ditch (T-002).

The Kauai Community College portion of the project area contains portions of the S.W. Wilcox II Learning Resource Center and the Natural Science Building. The campus opened in 1977 (Wilson Okamoto Corporation 2012), after the land was donated by Grove Farm in 1972 (Grove Farm 2025). Both buildings were included in the original campus, meaning they were likely constructed in 1977 and are not historic buildings.

Table 17. Potential Historic Properties Identified during the Field Inspection of the Kauaʻi Portion of the HIFL Project Area at Nukoliʻi Beach

Temp. Site No.	SIHP No. (50-30-08)	Type	Possible Function	Probable Age
T-001	N/A	Concrete jetty	Transportation	Post-Contact
T-002	N/A	Grate/ditch	Water control	Post-Contact/Recent
N/A	-02235	Ditch	Water control	Post-Contact



Figure 52. Spatial distribution of potential historic properties that were identified during the field inspection of the Nukoli'i Beach portion of the HIFL project area.



Figure 53. T-001, a concrete jetty with close-up of cylindrical structure in the Nukoli'i Beach portion of the HIFL project area (view to northwest).



Figure 54. Overview showing T-001, a concrete jetty on the shoreline in the Nukoli'i Beach portion of the HIFL project area (view to northeast).



Figure 55. Overview of T-001, showing additional cylindrical structures which extend further offshore in the Nukoli‘i Beach portion of the HIFL project area (view to northwest).



Figure 56. Close-up of T-002, metal grate with drainage ditch in the Nukoli‘i Beach portion of the HIFL project area (view to northwest).



Figure 57. Overview of SIHP 50-30-08-02235 ditch taken from Kauaʻi Beach Drive in the Nukoliʻi Beach portion of the HIFL project area (view to northwest).



Figure 58. Overview of SIHP 50-30-08-02235 ditch taken from Kauaʻi Beach Drive in the Nukoliʻi Beach portion of the HIFL project area (view to southeast).



Figure 59. Overview taken from shoreline, showing Nukoli'i Beach Park and associated facilities within the Nukoli'i Beach portion of the HIFL project area (view to west).



Figure 60. Overview of Nukoli'i Beach Park taken from the northwest corner of the Nukoli'i Beach portion of the HIFL project area (view to southeast).



Figure 61. Overview showing Kauaʻi Beach Drive within the Nukoliʻi Beach portion of the HIFL project area (view to east).



Figure 62. Overview taken from the east corner of the Kauaʻi Community College portion of the HIFL project area, showing the S.W. Wilcox II Learning Resource Center with a *milo* tree in foreground (view to west).



Figure 63. Overview showing the Natural Science Building from the south corner of the Kauaʻi Community College portion of the HIFL project area (view to north).

3.2 OʻAHU CABLE LANDING SITE

Pacific Legacy, Inc. conducted a field inspection of the proposed Oʻahu portion of the HIFL project area at Barbers Point Beach Park on March 6, 2025. The inspection was conducted by Pacific Legacy archaeologists Jillian Swift, Ph.D. and Daniel Mehert-Ab, B.A.

No potential historic properties were identified during the field inspection. Figure 64 through Figure 66 provide overview photos of the Oʻahu portion of the HIFL project area at Barbers Point Beach Park.



Figure 64. Overview of northern portion of the Oʻahu portion of the HIFL project area at Barbers Point Beach Park showing cul-de-sac and utility poles (view to northwest).



Figure 65. Overview of the southern part of the Oʻahu portion of the HIFL project area at Barbers Point Beach Park (view to southeast).



Figure 66. Overview of eastern part of the Oʻahu portion of the HIFL project area at Barbers Point Beach Park with Campbell Industrial Park in the background (view to northeast).

3.3 MAUI CABLE LANDING SITE

Pacific Legacy, Inc. conducted a field inspection of the proposed Maui portions of the HIFL project area at Kahului Harbor and UH Maui College on March 13, 2025. The field inspection was conducted by Pacific Legacy archaeologists Jillian Swift, Ph.D. and Daniel Mehert-Ab, B.A.

The UHMC portion of the project area includes the Maui County Recycling Center, and the upper *mauka* campus parking lot near Wahine Piʻo Avenue, and the west portion of ʻIke Science Building. The current campus occupies the original site of Maui Vocational School, established in 1931 in the northeastern portion of the current campus. Construction of the ʻIke Science Building was completed in 2014.

No potential historic properties were identified during the field inspection. Figure 67 through Figure 70 provide overview photos of the Maui portions of the HIFL project area.



Figure 67. Overview of the northernmost part of the Kahului Harbor portion of the HIFL project area at the shoreline (view to west).



Figure 68. Overview of the portion of the HIFL project area at Kahului Harbor looking towards Kahului Harbor (view to northeast).



Figure 69. Overview of the UH Maui College portion of the HIFL project area showing the campus entrance on Wahinepio Ave. (view to north).



Figure 70. Overview of southwest corner of the portion of the HIFL project area at UH Maui College showing the ʻIke Leʻa Building (view to northeast).

3.4 MOLOKAI CABLE LANDING SITE

Pacific Legacy, Inc. conducted a field inspection of the Molokai portions of the HIFL project area at Molokai Yacht Club and Molokai Education Center on March 5, 2025. The inspection was conducted by Pacific Legacy archaeologists Jillian Swift, Ph.D. and Samara Albuquerque, B.A.

The field inspection identified a single potential historic property within the project area (Table 18; Figure 71 through Figure 73). Overview photographs of the Molokai Yacht Club portion of the project area are presented in Figure 74 through Figure 79 and photos of the portion of the project area at the Molokai Education Center are shown in Figure 80 and Figure 81. The newly identified potential historic property consists of a debris pile (T-003) in the northern portion of the *makai* portion of the project area. T-003 is a large debris pile containing concrete slabs with exposed rebar, scrap metal, and some cut tree trunks and other vegetation, indicating that this may be a very late post-Contact and/or recent deposit.

Portions of two historic properties were previously identified within the current project area (SIHP 50-60-03-00630 and 50-60-03-02573). Both sites are pre- and post-Contact subsurface cultural deposits. No indications of SIHP -00630 or -02573 were visible from the surface during the field inspection. Subsurface testing would be necessary to identify whether these subsurface historic properties are present and to validate their extent.

No potential historic properties were identified within the portion of the HIFL project area at the Molokai Education Center. The current location of the Molokai Education Center campus opened in 1999 (UHMC 2025).

Table 18. Potential Historic Property Identified during the Field Inspection of the Molokai Portion of the HIFL Project Area at Molokai Yacht Club

Temp. Site No.	Type	Possible Function	Probable Age
T-003	Debris pile	Refuse	Post-Contact/Recent



Figure 71. Spatial distribution of potential historic property that was identified during the field inspection of the HIFL project area at the Molokai Yacht Club.



Figure 72. Potential historic property, T-003, a debris pile identified within the HIFL project area at the Molokai Yacht Club (view to west).



Figure 73. Overview showing T-003 debris pile located on the right side of a line of shipping containers within the HIFL project area at the Molokai Yacht Club (view to southwest).



Figure 74. Overview of northern portion of the HIFL project area at the Molokai Yacht Club, showing T-003 on the eastern side (view to northeast).



Figure 75. Overview of the open area behind the Molokai Yacht Club Building in the recorded location of the subsurface deposit SIHP 50-60-03-00630 within the HIFL project area at the Molokai Yacht Club (view to northeast).



Figure 76. Overview of containers on the west side of Molokai Yacht Club building, in the vicinity of the previously recorded location of SIHP 50-60-03-02573 within the HIFL project area at the Molokai Yacht Club (view to east).



Figure 77. Overview of the southern portion of the HIFL project area at the Molokai Yacht Club showing the Molokai Yacht Club building (view to north).



Figure 78. Overview of shoreline in the southernmost portion of the HIFL project area at the Molokai Yacht Club (view to east).



Figure 79. Overview of the southwest portion of the HIFL project area at the Molokai Yacht Club (view to west).



Figure 80. Overview of the portion of the Molokai HIFL project area at the Molokai Education Center taken from Alanui Kaimike Street (view to southwest).



Figure 81. Overview of the west side of the portion of the HIFL project area at the Molokai Education Center campus (view to south).

3.5 LĀNAʻI CABLE LANDING SITE

Pacific Legacy, Inc. conducted a field inspection of the proposed Lānaʻi portion of the HIFL project area at Mānele Harbor on February 20, 2025. The inspection was conducted by Pacific Legacy archaeologists Jillian Swift, Ph.D. and Ena Sroat, B.A.

The field inspection identified two potential historic properties within the project area, likely related to post-Contact ranching and related activities (Table 19, Figure 83 through Figure 89). Overview photographs of the project area are presented in Figure 82, Figure 90, Figure 91. On the eastern side of the project area, a concrete ditch segment (T-004) was identified. The edges of the ditch are amorphous and informal, incorporating cobbles and boulders, and extending towards the harbor. Additionally, a retaining wall constructed of basalt stones (T-005) was also observed on the eastern side of the project area. Only a small portion of the northern extent of the wall is within the project area.

Table 19. Potential Historic Properties Identified during the Field Inspection of the Lānaʻi Portion of the HIFL Project Area

Temp. Site No.	Type	Possible Function	Probable Age
T-004	Concrete ditch	Water control	Post-Contact
T-005	Stone wall	Soil retention	Post-Contact



Figure 82. Overview of the landscaped park area at the Mānele Small Boat Harbor with a grill and bar under a mature Ficus tree (view to southeast).



Figure 83. Spatial distribution of potential historic properties that were identified during the field inspection of the Lānaʻi portion of the HIFL project area at Mānele Harbor.



Figure 84. T-004, a concrete ditch identified within the Lānaʻi portion of the HIFL project area (view to east).



Figure 85. Plan view T-004, a concrete ditch identified within the Lānaʻi portion of the HIFL project area; outer edges of ditch are amorphous and informal, incorporating cobbles and boulders (view to southwest).



Figure 86. T-005, a stone wall identified within the Lānaʻi portion of the HIFL project area, running along top of small bluff (view to east).



Figure 87. North end of T-005 wall identified within the Lānaʻi portion of the HIFL project area (view to southwest).



Figure 88. T-005, wall identified within the Lānaʻi portion of the HIFL project area, showing the north end that is possibly located within project area (view to northwest).



Figure 89. Central and northern portion of T-005, a wall identified within the Lānaʻi portion of the HIFL project area, showing construction style (view to southwest).



Figure 90. Overview of a portion of the park area around the harbor, showing the comfort stations (view to southwest).



Figure 91. Overview of the west edge of the *kiawe* growth along the road leading to the beach (view to southwest).

3.6 HAWAIʻI CABLE LANDING SITE

Pacific Legacy, Inc. conducted a field inspection of the Hawaiʻi Island portions of the HIFL project area at the Pacific Aquaculture and Coastal Resource Center and UH Hilo on February 12, 2025. The inspection was conducted by Pacific Legacy archaeologists Jillian Swift, Ph.D. and Daniel Mehert-Ab, B.A.

The field inspection identified three potential historic properties within the PACRC portion of the HIFL project area, all three of which are likely associated with post-Contact activities (Table 20, Figure 92 through Figure 98). Overview photographs of the PACRC portion of the project area near Hilo Harbor are presented in Figure 100 through Figure 102, and those in the UH Hilo campus portion are shown in Figure 103 and Figure 104. T-006 and T-007 consists of circular and rectangular concrete tanks that were likely constructed in 1965-1966 as part of the infrastructure for the Hilo Sewage Treatment Plant, and which later became fish rearing tanks when the plant was repurposed into PACRC. T-008 consists of metal rebar and concrete structures that may have been related to infrastructure for the former sewage facility. A modern low, rectangular stone platform with *kī* plants at three corners was also observed on the *makai* side of the project area, and is a recently constructed memorial for a local man known as Uncle Piggy, for whom this area has also been nicknamed "Piggy's Point."

A concrete culvert (T-009) was identified within the UH Hilo portion of the HIFL project area, in a grassy area, north of the Edith Kanakaʻole Building. A portion of the HIFL project area at the UH Hilo campus includes parts of the Wentworth and Business Ed and Tech buildings. The current location of UH Hilo campus was established in 1955 and the Wentworth Building (T-010) and Business Education and Technology Building (T-011) were likely part of the original construction and are thus historic buildings.

Table 20. Potential Historic Properties Identified during the Field Inspection of the Hawaiʻi Island Portions of the HIFL Project Area at PACRC and UH Hilo

Temp. Site No.	Type	Possible Function	Probable Age
T-006	Circular and rectangular concrete tanks	Repurposed wastewater infrastructure	Post-Contact
T-007	Circular and rectangular concrete tanks	Repurposed wastewater infrastructure	Post-Contact
T-008	Metal and concrete pipe infrastructure	Wastewater treatment infrastructure	Post-Contact
T-009	Concrete culvert	Water control	Post-Contact
T-010	Wentworth Building	Education	1955
T-011	Business Education and Technology Building	Education	1955



Figure 92. Spatial distribution of potential historic properties and a modern platform that were identified during the field inspection of the PACRC portion of the HIFL project area.

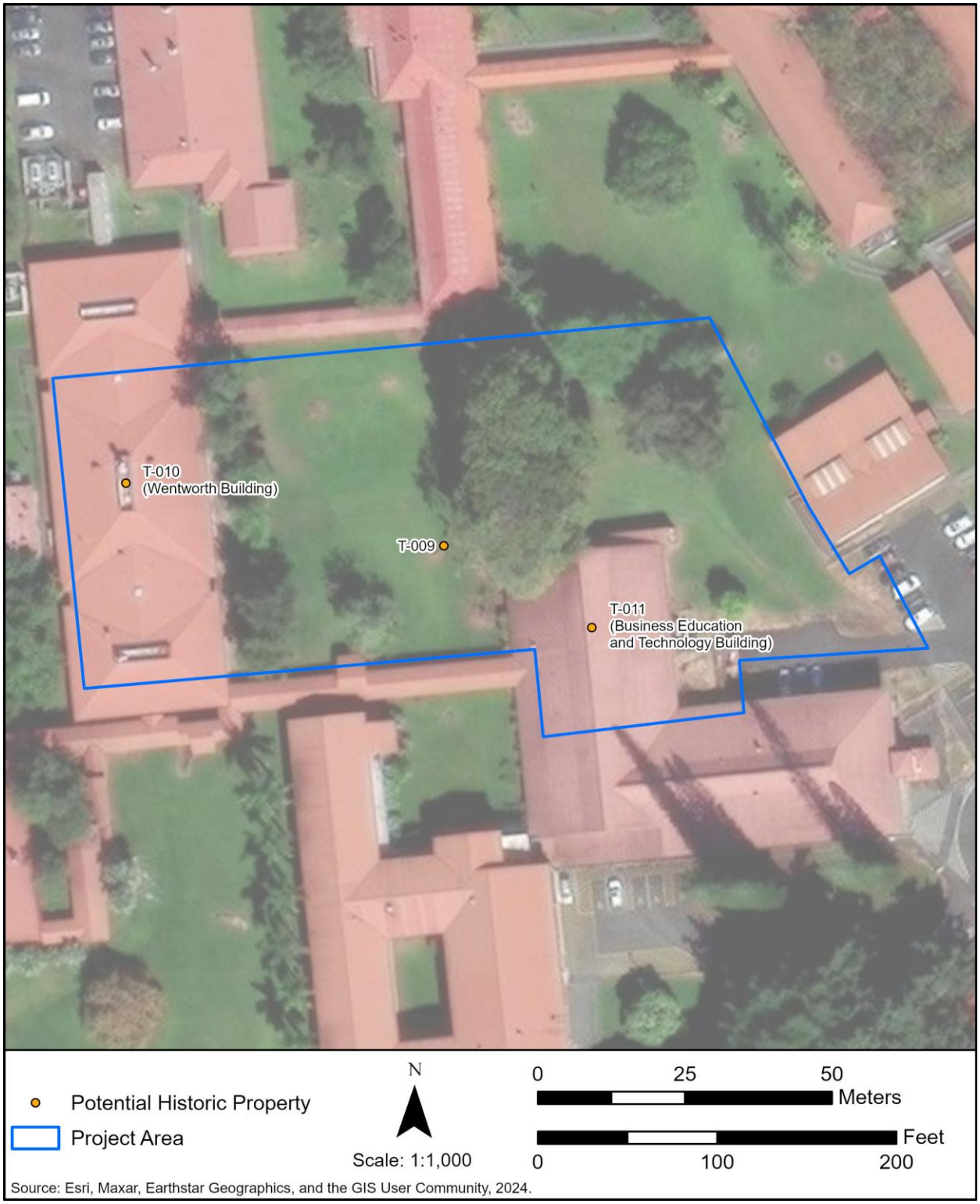


Figure 93. Spatial distribution of potential historic properties that were identified during the field inspection of the UH Hilo portion of the HIFL project area.



Figure 94. Overview showing the T-006 large concrete circular tank at the PACRC facility (view to north).



Figure 95. T-006, rectangular concrete and metal tank adjacent to large circular tank in the HIFL project area at PACRC (view to southwest).



Figure 96. T-007, rectangular concrete tank in the portion of the HIFL project area at PACRC (view to southeast).



Figure 97. T-008, metal and concrete components of possible sewage treatment facility infrastructure in the portion of the HIFL project area at PACRC (view to northwest).



Figure 98. T-009, concrete culvert in the portion of the HIFL project area at UH Hilo (view to south).



Figure 99. Modern low stone rectangular platform identified within the portion of the HIFL project area at UH Hilo (view to west).



Figure 100. Overview of the PACRC facility from the southwest corner of the portion of the HIFL project area at PACRC (view to north).



Figure 101. Overview of the central portion of the HIFL project area at PACRC (view to north).



Figure 102. Overview of the shoreline portion of the HIFL project area at PACRC (view to west).



Figure 103. Overview of the portion of the HIFL project area at UH Hilo (view to north).



Figure 104. Overview showing the east side of Business Ed and Tech Building (T-011) with utilities area in foreground (behind walkway) and parking lot to left, within the portion of the HIFL project area at UH Hilo (view to north).

4.0 SUMMARY AND RECOMMENDATIONS

A literature review and field inspection were conducted for the proposed Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system with cable landing sites located on Kauaʻi, Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Islands. The literature review consisted of a review of historical documents, historical maps and aerial photographs, and reference materials. The literature review revealed diverse land use through time in the proposed project area. An archaeological field inspection was conducted by Pacific Legacy archaeologists.

The purpose of this study was to investigate previous land use of the proposed project area and to determine whether historic properties exist in the proposed project area. It is also intended to facilitate project planning and support the project's historic preservation review process under HRS Chapter 6E and Section 106 of the NHPA.

4.1 KAUAʻI CABLE LANDING SITE

The proposed Kauaʻi cable landing site is located in Hanamāʻulu and Niumalu Ahupuaʻa in Puna Moku (Modern District of Līhuʻe) [TMKs: (4) 3-4-007:003 (por.), (4) 3-7-003:007 (por.), (4) 3-7-003:017 (por.), and (4) 3-7-003:999 (Kūhiō Highway ROW)]. The area around the Kauaʻi portions of the HIFL project area was permanently inhabited and used intensively during the pre-Contact period, with permanent habitation and agricultural sites, *heiau*, and numerous trails crossing the landscape. The development of sugar plantations such as the Lihue Plantation and Grove Farm, as well as the settlement of westerners in the region, marked the beginning of lasting changes to the area's traditional community and landscape. Modern development included the construction of the Kauaʻi Community College campus and the Nukoliʻi Beach Resort.

During the field inspection, one previously identified historic property was identified within the Nukoliʻi Beach portion of the HIFL project area: a post-Contact water control ditch (SIHP 50-30-08-02235) estimated to have been built in the early 1960s. Two potential historic properties were newly identified in the Nukoliʻi Beach portion of the project area: a concrete jetty off the Nukoliʻi Beach shoreline (T-001) and a water control feature consisting of a metal drainage gate and small drainage ditch (T-002).

4.2 OʻAHU CABLE LANDING SITE

The proposed Oʻahu cable landing site is situated in Honouliuli Ahupuaʻa, ʻEwa District [TMKs: (1) 9-1-026: 027, (1) 9-1-026:999 (Olaʻi Street ROW)]. The area surrounding the Oʻahu portion of the HIFL project at Barbers Point Beach Park was renowned for its rich marine life, numerous limestone pits, and significant trails during the pre-Contact period. With foreign arrivals also came foreign diseases which drastically reduced the Native Hawaiian population. The area became popular for cattle and sheep ranching with the opening of Honouliuli Ranch, as well as sugar cane with the establishment of the Ewa Plantation Company. There was a major shift in land use from agricultural to military in the late nineteenth century. Modern development included the establishment of Campbell Industrial Park around the area of Barbers Point Beach Park.

No historic properties were identified within the Oʻahu portion of the HIFL project area during the field inspection.

4.3 MAUI CABLE LANDING SITE

The proposed Maui cable landing site is within Wailuku Ahupuaʻa, Wailuku District [TMKs: (2) 3-7-001:021 (por.), (2) 3-7-001:022 (por.), (2) 3-7-001:999 (Kahului Beach Road ROW) (2) 3-8-007:001 (por.), (2) 3-8-007:040 (por.)]. The area around the Maui portions of the HIFL project area was abundant in marine resources and provided productive soils for planting of *kalo* during the pre-Contact period. For much of the nineteenth and early twentieth centuries, the sugarcane business and its major players drove development, including improvements to sea and overland routes to facilitate the transport of sugar from the cane fields to the mills, and to Kahului Harbor, which was dredged in 1900, for export. The town of Kahului continued to expand and develop in the late 1940s, and the 1950s saw further development, with the construction of a shopping center and the opening of the first hotels in Kahului.

No potential historic properties were identified in the Maui portions of the HIFL project area during the field inspection.

4.4 MOLOKAI CABLE LANDING SITE

The Molokai cable landing site is located within Kaunakakai Ahupuaʻa in Kona Moku (Modern District of Molokai) [TMKs: (2) 5-3-001:003 (por.); (2) 5-3-001:011 (por.); (2) 5-3-003:013 (por.), (2) 5-3-003:014 (por.), (2) 5-3-003:999 (Alanui Kaimike Street ROW)]. The area surrounding the Molokai portions of the HIFL project area is known for its marine resources during the pre-Contact period and a wide range of traditional fishing practices were written about at Kaunakakai. In addition, several *heiau* were located in the vicinity. The former site of Kamehameha V seaside vacation property is today Mālama Cultural Park, which now serves as an important community gathering space in the region, supporting a wide range of recreational, cultural, and educational activities. The freshwater springs located offshore near Kaunakakai prevented coral growth in this area, which in turn provided a natural break in the reef whereby boats could access the shoreline and find calm waters with good fishing. In 1898, the American Sugar Company, Ltd (ASCO) built a wooden wharf at Kaunakakai to facilitate shipping sugarcane and other cargo from Molokai.

During the field inspection, one potential historic property feature was identified in the Molokai Yacht Club portion of the project area, The newly identified potential historic property consisted of a debris pile (T-003) containing concrete slabs with exposed rebar, scrap metal, and some cut tree trunks and other vegetation, indicating that this may be a very late post-Contact and/or recent deposit. The two subsurface historic properties that were previously identified within the Molokai Yacht Club portion of the project area were not identified during the field inspection, but may be revealed through subsurface testing in that area.

4.5 LĀNAʻI CABLE LANDING SITE

The Lānaʻi cable landing site is situated within Pālāwai Ahupuaʻa in the Lāhaina District [TMKs: (2) 4-9-017:006 (por.), (2) 4-9-017:027 (por.)]. The area around the Lānaʻi portion of the HIFL project area provided abundant marine resources and a launch for travels to and from Lānaʻi during the pre-Contact period. There were several sites of pre-Contact settlement in Pālāwai and Kamaʻo Ahupuaʻa, including a permanent village in Mānele, and along the gulch were house sites, terraces, enclosures, and mulch pits which supported agricultural activities. The sand dunes extending behind Mānele have been found to contain *iwi kupuna*. Impacts to Lānaʻi included significant post-

Contact deforestation, caused by the introduction of ranching and nonnative terrestrial mammals, the *ʻiliahi* (sandalwood; *Santalum paniculatum*) trade, increased demand for staple crops, and new demands on firewood to process whale blubber. A breakwater was built in 1873 to protect a portion of Mānele Bay. In 1922, the Lanai Company's ranch was acquired as part of the Hawaiian Pineapple Company, who began to reduce the cattle herd to make way for large-scale pineapple cultivation, which were shipped from Mānele Harbor. Bulldozing associated with the Mānele Small Boat Harbor Project in the 1960s and 1970s had detrimental impacts to nearby archaeological sites.

Two potential historic properties were newly identified within the Lānaʻi portion of the HIFL project area during the field inspection. The two newly identified potential historic property features included a concrete ditch segment (T-004) and a retaining wall constructed of basalt stones (T-005) likely related to post-Contact ranching and related activities.

4.6 HAWAIʻI ISLAND CABLE LANDING SITE

The Hawaiʻi Island cable landing site is in Waiākea Ahupuaʻa, South Hilo District [TMKs: (3) 2-1-009:001 (por.), (3) 2-1-009:041 (por.), (3) 2-1-011:004 (por.), (3) 2-1-011:005 (por.), (3) 2-1-011:010 (por.), (3) 2-4-001:167 (por.)]. The area around the Hawaiʻi Island portions of the HIFL project area at PACRC and UH Hilo was known for permanent habitation and agricultural sites during the pre-Contact period. References to streams, grottos, and waterholes, as well as shoreline access, fishing practices, and canoe landings, reflect the abundant water resources in the area. In the early 1800s, Hilo's forests and harbor made it an appealing location for the sandalwood trade. The growth of the sugar industry through the first half of the 1900s necessitated improved over land and sea transport infrastructure, which included harbor facilities at Hilo Bay and the development of the Hilo railroad, which was in operation from 1899 to 1946. In 1966, a municipal sewage system was developed for Hilo, which included the installation of a Hilo Sewage Treatment Plant in the current location of the PACRC facilities, and in 1998, the University of Hawaiʻi at Hilo proposed redeveloping the Old Hilo Wastewater Treatment Plant into PACRC in support of UH Hilo's aquaculture and marine science programs. The first formal, university-level instruction in Hilo began in 1945 and continued to expand up until 1973.

During the field inspection, six potential historic property features, including two historic buildings, were identified in the Hawaiʻi Island portions of the HIFL project area. The six newly identified potential historic property features in the PACRC portion of the HIFL project area included circular and rectangular concrete tanks (T-006 and T-007) that were likely constructed in 1965-1966 as part of the infrastructure for the Hilo Sewage Treatment Plant, metal rebar and concrete pipe infrastructure (T-008) that may have been related to the former sewage facility. A concrete culvert (T-009), and the Wentworth Building (T-010) and Business Education and Technology Building (T-011), which were likely part of the original construction in 1955, were identified within the UH Hilo portion of the HIFL project area.

4.7 RECOMMENDATIONS

The field inspection documented one previously identified historic property and 11 additional potential historic property features within the project area. An architectural survey and an AIS with subsurface testing are recommended to fully identify and document all potential historic properties and provide significance assessments and recommendations in accordance with HRS Chapter 6E and Section 106 of the NHPA.

5.0 REFERENCES CITED

Ahlo, H.M., and R.J. Hommon
1983 *An Archaeological Reconnaissance Survey of the Site of the Proposed Solid Waste Processing and Resource Recovery Facility, Honouliuli, Ewa, Oahu.* Belt Collins & Associates, Honolulu.

Akoi, R.
1989 *Kuʻu Home I Keaukaha: An Oral History*. Hui Hoʻomau O Keaukaha Panaewa.

Athens, J.S.
1991 *Archaeological Investigations at the Canoe Shed Complex of Hulopoʻe Bay, Lanaʻi, Site 50-40-98-85*. International Archaeological Research Institute, Inc., Honolulu.

Athens, J.S., M.W. Kaschko, J.R. McNeill, D.J. Welch, and S. Wickler
1992 *Archaeological Investigations at Hulopoe Beach, Lanaʻi, Hawaii Part I: Archaeological Site and Feature Descriptions, Mapping, and Excavations*. International Archaeological Research Institute, Inc., Honolulu.

Athens, J.S., J.R. McNeill, M.J. Tomanari-Tuggle, D.J. Welch, and S. Wickler
2000a Archaeology on a South Coast Landscape Hulopoʻe, Lanaʻi, Hawaiʻi Volume II: Site and Feature Descriptions. International Archaeological Research Institute, Inc., Honolulu.
2000b *Archaeology on a South Coast Landscape Hulopoʻe, Lanaʻi, Hawaiʻi Volume III: Site and Feature Descriptions*. International Archaeological Research Institute, Inc., Honolulu.

Athens, J.S., and C.L. Silva
1983 *Archaeological and Historical Investigations at a Property Near Kaunakakai Wharf, Island of Molokai, Hawaii*. Archeological Consultant, Honolulu.

Baggs, P.N., and M.F. Dega
2016 *Archaeological Monitoring Report for the 215 Wakea Avenue Flexible Warehouse Project at the Former Maui Land and Pineapple Cannery, Kahului, Wailuku Ahupuaʻa, Wailuku District, Island of Maui, Hawaiʻi [TMK: (2) 3-7-002:001].* Scientific Consultant Services, Inc., Honolulu.

Barna, B., and L.M.U. Kepaʻa
2023 *Archaeological Monitoring Report for the Kalanianaʻole Avenue Reconstruction Project, Kamehameha/Railroad Avenue to Kauhane Avenue, County Job No. E 435 2A TMKs: (3) 2-1-006 (Por.), 007 (Por.), 008 (Por.), 009 (Por.), 010 (Por.), and 020 (Por.) Waiākea Ahupuaʻa South Hilo District Island of Hawaiʻi*. ASM Affiliates, Hilo.

Belluomini, S.A., T.M. Yucha, D.W. Shideler, and H.H. Hammatt
2017 *Archaeological Inventory Survey Report for the Proposed Kapolei Corporation Yard, Kalaeloa, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu TMK: [1] 9-1-026:004*. Cultural Surveys Hawaiʻi, Inc., Kailua.

Bennett, J.D.
2003 The Coastal Defenses of Kauai, T.H., 1942-1944. *The Coastal Defense Journal* 17(2): 66–77.

Bennett, W.C.
1931 *The Archaeology of Kauai.* Bulletin 80. Bishop Museum, Honolulu.

Berrigan, D.M., A.E. Haun, and J.D. Henry
2008 *Archaeological Monitor Report Mānele Small Boat Harbor Lands of Kamao and Palawai, Lahaina District, Island of Lanai (TMK: [2]-4-9-017:002, 006)*. Haun & Associates, Keaʻau.

Bishop, A.
1854 *Ewa Station Reports for 1854*. Microfilm. Hawaiian Mission Children's Museum, Honolulu.

Borthwick, D., J. Collins, W.H. Folk, and H.H. Hammatt
1993 *Archaeological Survey and Testing of Lands Proposed for Research and Technology Lots at the University of Hawaii at Hilo (TMK 2-4-01:7 and 41).* Cultural Surveys Hawaiʻi, Inc., Kailua.

Borthwick, D.F., and H.H. Hammatt
1994 *Archaeological Inventory Survey of a Portion of Drainage System A, Kaunakakai, Molokaʻi (TMK: 5-3-02:Por.72; 5-3-03: Por.01 ; 5-3-09:Por. 17).* Cultural Surveys Hawaiʻi, Inc., Kailua.
Carlson, A.K., and P.H. Rosendahl
1990 *Archaeological Inventory Survey, Campbell Industrial Park—Kami Loop Subdivision*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
Ching, F., and G. Austin
1971 *An Archaeological Reconnaissance of the Proposed Manele Diversion Channel Project, Job H.C. 4001 Manele Bay, Lanai Island, Hawaii*. Department of Land and Natural Resources - State Parks, State of Hawaiʻi.
Ching, F.K.W., P.B. Griffin, W.P. Kikuchi, N.H. Albrecht, J.C. Belshe', and C. Stauder
1973 *The Archaeology of Puna, Kauaʻi: Niumalu Ahupuaʻa, Loko Kuapa O Alekoko.* Archaeological Research Center Hawaii, Lawai.
Clark, M.D., J.D. Nelson, and R.B. Rechtman
2012 *An Archaeological Inventory Survey for the Proposed Kapiʻolani Street Extension Project (TMKs: 3-2-4-04:181, 182, and 3-2-4-56:029), Waiākea Ahupuaʻa, South Hilo District, Island of Hawaiʻi.* Rechtman Consulting, Inc., Hilo.
Clark, S.D.
1979 *Archaeological Reconnaissance Survey for Barbers Point Beach Park Improvements, Ewa, Oahu (TMK: 9-1-26:27).* Department of Parks and Recreation, Kualoa Archaeological Research Project, Honolulu.
Conde, J.C., and G.M. Best
1973 Sugar Trains, Narrow Gauge Rails of Hawaiʻi. Glenwood Publishers, Felton.
Condit, J.J., and J. Allen
2011 *Archaeological Monitoring, Hawaiian Electric Company Generator and Substation Sites, Campbell Industrial Park, Honouliuli Ahupuaa, Ewa District, Island of Oahu, State of Hawaii Portions of Oahu Island Tax Map Keys (TMK) 9-1-014:014 and 9-1-026:038.* International Archaeological Research Institute, Inc., Honolulu.
Corbin, A.B., A.T. Walker, L. Kalima, H.W. Smith, and S.T. Goodfellow
2002 *Archaeological Inventory Survey Ocean Bay Plantation at Hanamāʻulu Land of Hanamāʻulu, Lihuʻe District, Island of Kauaʻi. (TMK:4-3-7-3:1;4-3-9-5:5).* Paul H. Rosendahl, Ph.D., Inc., Hilo.
Cordle, S., and M.F. Dega
2007 *An Archaeological Monitoring Report for the Proposed Baldwin High School Eight Classroom Building (GPC 20003/51) [County/DSA] Ahupua'a of Wailuku, District of Wailuku, Island of Maui, Hawaiʻi [TMK: (2) 3-8-007:004].* Scientific Consultant Services, Inc., Honolulu.
Davis, B.D.
1977 *Cultural Reconnaissance Report Kapaʻakea Homestead Flood Control Project, Kapaʻakea, Molokaʻi Island, Hawaiʻi, State of Hawaiʻi*. Archaeological Research Center Hawaiʻi, Inc., Honolulu.
1988 *Report on Archaeological Reconnaissance at the Proposed HECO Generating Station, Barbers Point, Honouliuli ʻEwa, Oʻahu TMK 9-1-31*. International Archaeological Research Institute, Inc., Honolulu.
1989 *Report on Archaeological Investigations at the Proposed HECO Generating Station, Barbers Point, Honouliuli ʻEwa, Oʻahu. TMK 9-1-31*. International Archaeological Research Institute, Inc., Honolulu.
1990 *Archaeological and Paleontological Investigations at the Proposed HECO Barbers Point Generating Station, Honouliuli, ʻEwa, Oʻahu*. Applied Research Group, Bishop Museum, Honolulu.

Dega, M.F., and J. Powell
2003 *Archaeological Monitoring During Phase I of the Kauai Rural Fiber Optic Duct Lines Project, Kaua'i Island, Hawai'i*. Scientific Consultant Services, Inc., Honolulu.
Department of Land and Natural Resources (DLNR)
1974 *Statewide Inventory of Historic Places*. On file at the Hawai'i State Historic Preservation Division (SHPD), Kapolei.
Desilets, M.
2011 *Archaeological Monitoring for Soil Boring, Kaunakakai Ahupua'a, Moloka'i District, Island of Moloka'i, Hawai'i (TMK 5-3-002-073).* Garcia and Associates, Kailua.
Devereux, T., and H.H. Hammatt
1998 *Archaeological Monitoring Report for Renovations to the War Memorial Stadium Complex Wailuku, Maui (TMK 3-8-07:55).* Cultural Surveys Hawai'i, Inc., Kailua.
1999 *Archaeological Monitoring Report of the 110-Acre Maui Central Park, Wailuku, Maui. TMK: (2)3-8-07:1 & 3-7-01:2.* Cultural Surveys Hawai'i, Inc., Kailua.
Dye, T.S. and E.H.R. Jourdane
2006a *Archaeological Assessment for the Proposed Cingular Wireless Kaunakakai Cell Site No. MAUIHI10258, 25 Kaunakakai Place, Kaunakakai, Kona District, Moloka'i Island, TMK:(2)5-3-1:076 Por*. T. S. Dye & Colleagues, Archaeologists, Inc., Honolulu.
2006b *Archaeological Assessment for the Proposed Verizon Wireless H2 Kaunakakai Cell Site VZW No. 2004005296, Moloka'i Education Center, 375 Kamehameha V Highway, Kaunakakai, Kona District, Moloka'i Island, TMK: (2)5-3-:014 Por*. T. S. Dye & Colleagues, Archaeologists, Inc., Honolulu.
Dye, T.S., K.S. Maly, C.E. Sholin, and N.J. DiVito
2013 *Archaeological Inventory Survey Addendum for Mānele Small Boat Harbor Modifications Land of Pālāwai and Kama'o, Lāhaina District, Lāna'i Island TMK: (2) 4–9–017:003.* T. S. Dye & Colleagues, Archaeologists, Inc., Honolulu.
Emory, K.P.
1924 *The Island of Lanai, A Survey of Native Culture*. Bishop Museum Press, Honolulu.
Escott, G.
2013 *An Archaeological Inventory Survey on Approximately 42.6 Acres of Land for the University of Hawai'i-Hilo Mauka Acquisition Project, Waiākea Ahupua'a, South Hilo District, Island of Hawai'i, Hawai'i [TMK: (3) 2-4-001:024 and 2-4-056-016].* Scientific Consultant Services, Inc., Honolulu.
Evslin, L.
2016 The Living Victims of Kauai's Tourism Economy. *Honolulu Civil Beat*. https://www.civilbeat.org/about.
Fager, M.W., and R.L. Spear
2000 *Monitoring During Wailua Golf Course Irrigation System Renovation, County of Kaua'i, Department of Public Works Division of Parks and Recreation Wailua Ahupua'a, Puna District, Kaua'i (TMK:3-9-05: Portion 1).* Scientific Consultant Services, Inc., Honolulu.
FAI Architects
2023a *Reconnaissance Level Survey for Ichiro "Iron" Maehara Baseball Stadium 211 Kanaloa Avenue Wailuku, Maui Island, Hawaii 96793 TMK: (2) 3-8-007:094*. FAI Architects, Honolulu.
2023b *Reconnaissance Level Survey for the War Memorial Complex Including the War Memorial Football Stadium and Satoki Yamamoto Track and Field Facility, War Memorial Gymnasium, and Coach Soichi Sakamoto Pool 201 Kanaloa Avenue Wailuku, Maui Island, Hawaii 96793 TMK: (2) 3-8-007:055*. FAI Architects, Honolulu.

Fechner, C.C., and P.L. Cleghorn
2017 *Archaeological Monitoring Report for the Proposed Stormwater Improvement Project at the Schnitzer Steel Hawaii Corp. Facility in Kapolei Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu [TMK: (1) 9-1-026:025].* Pacific Legacy, Inc., Kailua.

Fechner, C.C., J.A. Panuska, J.A. Swift, and M.A. Mulrooney
2025 *Archaeological Monitoring Report for the Improvements to the Department of Hawaiian Home Lands Water System on Molokaʻi Lands in Pālāʻau, Hoʻolehua, Nāʻiwa, Kahanui, and Kalamaʻula Ahupuaʻa Kona District, Island of Molokaʻi [TMK (2) 5-2-002:999; (2) 5-2-005:999; (2) 5-2-006:999; (2) 5-2-007:029, 030, 035, 039, 040, 055, 076-080, 082-085, 090, 999; (2) 5-2-008:001, 002, 004-006, 029, 043, 044, 046, 079, 084, 086, 091, 099, 102, 122, 123, 999; (2) 5-2-009:012, 016, 018, 026, 999; (2) 5-2-010:001-004, 007; (2) 5-2-012:034, 035, 999; (2) 5-2-013:010, 020, 021; (2) 5-2-021:999; (2) 5-2-023:009; (2) 5-2-024:999; (2) 5-2-025:999; (2) 5-2-032:068, 070; and (2) 5-2-033:047-053, 058, 061].* Pacific Legacy, Inc., Kailua.

Folk, W.H., N. Kamai, and H.H. Hammatt
2021 *Archaeological Monitoring Report for the Island School Project Nāwiliwili and Niumalu Ahupuaʻa, Līhuʻe District, Kauaʻi TMK: [4] 3-8-018:005*. Cultural Surveys Hawaiʻi, Inc., Kailua.

Foote, D.E., E.L. Hill, S. Nakamura, and F. Stephens
1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* U.S. Department of Agriculture, Soil Conservation Service, Government Printing Office, Washington D.C.

Fornander, A.
1918 *Fornander Collection of Hawaiian Antiquities and Folklore: The Hawaiians' Account of the Formation of Their Islands and Origin of Their Race, with the Traditions of Their Migrations, etc., as Gathered from Original Sources*. Memoirs of the Bernice Pauahi Bishop Museum Volume V – Part I. Bishop Museum Press, Honolulu.

Fredericksen, D.L., and E.M. Fredericksen
2002 *An Archaeological Inventory Survey of the Y. Hata Property in Wailuku Ahupuaʻa, District of Wailuku, Island of Maui (TMK: 3-4-27:01)*. Xamanek Researches, LLC, Pukalani.

Fredericksen, D.L., E.M. Fredericksen, and W.M. Fredericksen
1998 *Archaeological Data Recovery Report for Site 50-50-04-3120 Nisei Veterans Memorial Center TMK: 3-8-07:123 Wailuku Ahupuaʻa, Wailuku District, Maui Island*. Xamanek Researches, LLC, Pukalani.

Fredericksen, E.M.
1997 *Monitoring Report for the Kaiser Permanente Parking Expansion Project, Ahupuaʻa of Wailuku District of Wailuku, Island of Maui (TMK: 3-8-46:08).* Xamanek Researches, LLC, Pukalani.
2005a *An Archaeological Inventory Survey Report for Work Carried Out on The Kanaloa Avenue Improvements-Kahului Beach Road to Kaʻahumanu Avenue-Project, Wailuku Ahupuaʻa, Wailuku District, Maui Island (Federal Aid Project No. STP-0900 [56]) (TMK: 3-8-25 and 3-7-01: 02 [Portion]).* Xamanek Researches, LLC, Pukalani.
2005b *An Archaeological Monitoring Report for Waiʻehu Beach Road Miscellaneous Drainage Improvements from the Vicinity of Lower Main Street to Eha Street, Wailuku Ahupuaʻa, Wailuku District, Maui Island (TMK: 3-8-007).* Xamanek Researches, LLC, Pukalani.
2007 *Supplemental Archaeological Assessment Testing and Survey for the Maui Palms Hotel Redevelopment Project, Wailuku Ahupuaʻa, Wailuku District, Maui Island (TMK: [2] 3-7-03 Por. of 007 and 009).* Xamanek Researches, LLC, Pukalani.

Fredericksen, E.M., W.M. Fredericksen, and D.L. Fredericksen
1994 *An Inventory Survey of a 10-Acre Parcel of Land, Maui Central Park Parkway, Wailuku Ahupua'a, Wailuku District, Maui Island (TMK: 3-8-07:125).* Xamanek Researches, LLC, Pukalani.

Fredericksen, W.M., and D.L. Fredericksen
1992a *An Archaeological Inventory Survey for Owa Subdivision, A & B Properties, Inc. Kahului, Maui, Hawaii (TMK 3-8-07:38)*. Xamanek Researches, LLC, Pukalani.
1992b *An Inventory Survey of a Parcel of Land (TMK 3-8-07: 123), Located in the Ahupua'a of Wailuku, District of Wailuku, Island of Maui*. Xamanek Researches, LLC, Pukalani.
1992c *Archaeological Inventory Survey for the Parking Lot Expansion and Retention Basin on Maui Community College Campus (TMK 3-8-07: 40 & 43) Ahupua'a of Wailuku, District of Wailuku, Island of Maui*. Xamanek Researches, LLC, Pukalani.
1995 *Archaeological Inventory Survey and Subsurface Testing at the Site of Keiki Zoo Maui (TMK: 3-8-07: Por. 1).* Xamanek Researches, LLC, Pukalani.

Frey, J.J., and E.M. Fredericksen
2009 *An Archaeological Monitoring Report for the Kahului Concrete Sewer Laterals Replacement Project, Wailuku Ahupua'a, Wailuku District, Island of Maui (Various TMKs in Kahului).* Xamanek Researches, LLC, Pukalani.

Fuentes, R.N., A.K. Alvarez, M. Pinsonneault, and J. Steele
2022 *Archaeological Inventory Survey for Proposed New Improvements for Wenqiang Lin Residence 444 Ka'ao Circle Located in Wailuku Ahupua'a, Pū'ali Komohana District, Island of Maui TMK: (2) 3-8-031:004*. Atlas Archaeology, Wailuku.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.L. Chen, P.S. Chu, J.K. Eischeid, and D.M. Delparte
2013 Online Rainfall Atlas of Hawai'i. *Bulletin of the American Meteorological Society* 94:313-316.

Gibson, W.M.
1867 "The Tomb of Puupehe", as Told to Walter Murray Gibson by Piianaia, a Kupuna of Lanai. *Hawaiian Gazette*.

Gross, R., D. Byerly, A.E. Sims, and C. Craft
2022 *Archaeological Monitoring Report for Former Kaunakakai Chevron Bulk Storage Terminal, Kaunakakai Ahupua'a, Kona District, Moloka'i Island, Hawai'i, TMKs (2) 5-3-001:097 and 100 and Portions of (2) 5-3-001 :001, 002, 009, 010, 065, and Kaunakakai Place Right-of-Way*. Kleinfelder/GANDA, Honolulu.

Grove Farm
2025 *Grove Farm History. Grove Farm Museum*. http://www.grovefarm.org/history.

Groza, R., and H.H. Hammatt
2010 *Archaeological Monitoring Report For Wastewater Improvements at Kalaeloa City and County Beach Park (Also Known as Barbers Point Beach Park), Honouliuli Ahupua'a, 'Ewa District, O'ahu TMK: [1] 9-1-026:027*. Cultural Surveys Hawai'i, Inc., Kailua.

Hammatt, H.H.
2001 *Archaeological Assessment of the Proposed Sandwich Isles Communication Fiberoptic Cable Project Within Approximately 37 Miles (59.7 Kilometers) of Road Corridor on the Island of Moloka'i.* Cultural Surveys Hawai'i, Inc., Kailua.

Hammatt, H.H., and R. Chiogioji
1998 *Archaeological Assessment of an Approximately 11.5 Kilometer-Long Portion of the Kaumuali'i Highway Corridor Through Nāwiliwili, Ha'ikū, and Kōloa Ahupua'a, Island of Kaua'i.* Cultural Surveys Hawai'i, Inc., Kailua.

Hammatt, H.H., and D.W. Shideler
2004 *Archaeological and Cultural Impact Evaluation Study in Support of Development of the "One-Stop Center, Kauaʻi Community College" Project*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Handy, E.S.C.
1940 *The Hawaiian Planter, Volume I: His Plants, Methods, and Areas of Cultivation*. Bulletin 161. Bishop Museum Press, Honolulu.
Haun, A.E., and D. Henry
2000 *Archaeological Inventory Survey Hilo Harbor Facilities Expansion, TMK: 3-2-1-09: 2, 12, 41, 42 and TMK: 3-2-1-07: 20-37, Land of Waiakea, South Hilo District, Island of Hawaii*. Haun & Associates, Keaʻau.
Heidel, M., D.F. Borthwick, A. Bush, and H.H. Hammatt
1998 *Archaeological Data Recovery Report for Proposed Drainage System "A" at Kaunakakai, Molokai (TMK 5-3-02.Por. 72: 5-3-63.Por. 01; 5-3-09:Por, 17).* Cultural Surveys Hawaiʻi, Inc., Kailua.
Heidel, M., T. Devereux, L. Pyle, and H.H. Hammatt
1996 *Archaeological Reconnaissance with Subsurface Testing for Proposed 110-Acre Maui Central Park, Wailuku, Maui (TMK: 8-8-07:1 and 3-7-01:2).* Cultural Surveys Hawaiʻi, Inc., Kailua.
Heidel, M., L. Pyle, and H.H. Hammatt
1997 *Archaeological Inventory Survey of the 110-Acre Maui Central Park, Wailuku, Maui (TMK: 3-8-07:1 and 3-7-01:2).* Cultural Surveys Hawaiʻi, Inc., Kailua.
Henry, J.D., A.T. Walker, K. Maly, and P.H. Rosendahl
1993 *Archaeological Inventory Survey, Grove Farm Lihue/Puhi Project Area, Land of Nawiliwili, Niumalu, and Haiku, Lihue District, Island of Kauai*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
Hodara, R., and M.F. Dega
2015a *An Archaeological Assessment Report for the 215 Wakea Avenue Flexible Warehouse Project at the Former Maui Land and Pineapple Cannery, Kahului, Wailuku Ahupuaʻa Wailuku District Island of Maui, Hawaiʻi [TMK: (2) 3-7-002:001].* Scientific Consultant Services, Inc., Honolulu.
2015b *An Archaeological Monitoring Report for a 0.76-Acre Parcel in Wailuku, Wailuku Ahupuaʻa, Wailuku District, Island of Maui, Hawai'i [TMK: (2) 3-8-037:028].* Scientific Consultant Services, Inc., Honolulu.
Hommon, R., and H.M. Ahlo Jr.
1984 *Archaeological Test Excavations at the Site of the Proposed Solid Waste Processing and Resource Recovery Facility, Honouliuli, ʻEwa, Oʻahu*. Science Management Inc., Honolulu.
Hunkin, N., D. Shideler, and H.H. Hammatt
2014 *Archaeological Inventory Survey for the Island School Project, Nāwiliwili Ahupuaʻa, Līhuʻe District, Kauaʻi Island, TMK: (4) 3-8-002:016*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Hunt, T.L., and M.J. McDermott
1994 *Archaeological Inventory Survey Puʻainako Street Extension Project, Lands of Waiakea, Kukuau 1 and 2, and Ponahawai, South Hilo District, Island of Hawaiʻi*.
Kamai, N., G. Ida, R. Groza, and H.H. Hammatt
2016 *Archaeological Inventory Survey Report for the Kauaʻi Community College Rezone Campus Project, Haʻikū, Niumalu, Nāwiliwili Ahupuaʻa, Līhuʻe District, Kauaʻi. TMKs: [4] 3-4-007:001, 002, 003, and 006.* Cultural Surveys Hawaiʻi, Inc., Kailua.
Kaschko, M.
1991a *Archaeological Test Excavations and Site Mapping for the Hulopoe Beach Park Development Area, Island of Lanai, Hawaii*. International Archaeological Research Institute, Inc., Honolulu.

1991b *Archaeological Test Excavations and Site Mapping for the Manele Multi-Family Residential Development Area, Island of Lanai, Hawaii*. International Archaeological Research Institute, Inc., Honolulu.

Kaschko, M., and S. Athens

1987 *Archaeological Inventory Survey of the Hulopoe Bay and Manele Bay Areas Island of Lanai, Hawaii*. International Archaeological Research Institute, Inc., Honolulu.

Kennedy, J.

1988a *Preliminary Reconnaissance Report Concerning TMK: 3-8-07, Located at Kahului, Maui*. Archaeological Consultants of Hawaii, Inc., Haleʻiwa.

1988b A*rchaeological Surface & Subsurface Testing Results for TMK 5-3-1:77, Kaunakakai, Island of Molokai*. Archaeological Consultants of Hawaii, Inc., Haleʻiwa.

1990 *Archaeological Subsurface Testing Results at the Site of the Proposed Maui Community Arts and Cultural Center, TMK:3-8-07, Located at Kahului, Maui*. Archaeological Consultants of Hawaii, Inc., Haleʻiwa.

Kennedy, J., P. Brennan, and S. Ireland

1993 *Archaeological Inventory Survey with Subsurface Testing Report for a Property Located at Portions of TMK: 3-8-07: 1, 40, 125, 117, and 3-7-01: 2, Wailuku Ahupuaʻa, Wailuku District, Island of Maui*. Archaeological Consultants of Hawaii, Inc., Haleʻiwa.

Kikuchi, W.K., and S. Remoaldo

1992 *Cemeteries of Kauaʻi, Volume 1*. Kauaʻi Community College and University of Hawaiʻi, Committee for the Preservation of Hawaiian Language, Art and Culture, Puhi.

Kirkendall, M.A.

2008 *Archaeological Assessment for the Proposed New Science Building at Maui Community College Kahului, Maui TMK (2) 3-8-007: 040.* Pacific Legacy, Inc., Wailuku.

Komori, E.

1983 *Results of an Archaeological Reconnaissance Survey and a Search of Historic Documents, TMK 5-3-01:2, Lots 521 and 522, Kaunakakai, Molokaʻi, Hawaiʻi*. Bishop Museum, Honolulu.

Landrum, J.

1984 *An Archaeological Reconnaissance of the U.S Coast Guard Harbor Range Lights Facility, TMK (2) 5-3-01:3, Kaunakakai, Molokaʻi*. Bishop Museum, Honolulu.

Lee-Greig, T.L., K.M. Folio, and H.H. Hammatt

2016 *Archaeological Inventory Survey Report for the Kaunakakai Drainage System "B" Improvements Project, Kaunakakai Ahupuaʻa, Molokaʻi District, Molokaʻi Island, TMKs: [2] 5-3-001:003 & 008 and 5-3-005:006 & 007*. Cultural Surveys Hawaiʻi, Inc., Kailua.

Lee-Greig, T.L., and H.H. Hammatt

2013 *Supplemental Archaeological Inventory Survey (AIS) Conducted for the Proposed Phase II Expansion of the Four Seasons Resort at Mānele Bay, Pālāwai Ahupuaʻa, Lāhainā District, Lānaʻi Island TMK: (2) 4-9-017:001,002, 007*. Cultural Surveys Hawaiʻi, Inc., Wailuku.

Longman, R.J., M.P. Lucas, J. McLean, et al.

2024 "Hawaiʻi Climate Data Portal (HCDP)." *Bulletin of the American Meteorological Society*.

Macdonald, G.A., A.T. Abbott, and F.L. Peterson

1983 *Volcanoes in the Sea. Second Edition*. University of Hawaiʻi Press, Honolulu.

Madeus, J.K., and H.H. Hammatt

2010 *An Archaeological Monitoring Report for the Kaunakakai Elementary School Grease Interceptor and Four Inch Sewer Line Installation and Replacement Project, Kaunakakai Ahupuaʻa, Kona District, Molokaʻi Island (TMK [2] 5-3-002:052).* Cultural Surveys Hawaiʻi, Inc., Wailuku.

Maly, K.
2013 *He Moʻolelo No Pālawāi A Me Kamaʻo Ma Lānaʻi A Kaululāʻau (A History of Pālāwai and Kamaʻo on Lānaʻi of Kaululāʻau).* Kumu Pono Associates, Hilo.
2020 *Mānele Small Boat Harbor Archaeological-Ethnographic Study Synthesis (Draft).* Kumu Pono Associates, Hilo.
Maly, K., A.T. Walker, and P.H. Rosendahl
1994 *Archaeological Inventory Survey, Waiākea Cane Lots, Portion of Parcel 6, Land of Waiākea, South Hilo District, Island of Hawaiʻi (TMK:2-4-57:01).* Paul H. Rosendahl, Ph.D., Inc., Hilo.
Mason Architects, Inc.
2003 *Historic Resources Survey, Evaluation, and Impact Assessment of Kapaʻa Relief Route Kuhio Highway Corridor Improvements Project Hanamaʻulu to Kapaʻa*. Mason Architects, Inc., Honolulu.
McCoy, P., and S.D. Clark
2008 *Final Report Archaeological and Cultural Impact Assessments for the Proposed H-POWER Expansion Project, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu TMK: (1) 9-1-026:30, 33, and 34.* Pacific Consulting Services, Inc., Honolulu.
McElroy, W.K., and M. Elison
2014 *Archaeological Monitoring Report for Kaunakakai Wharf Improvements, Kaunakakai Ahupuaʻa, Kona District, Island of Molokaʻi TMK: (2) 5-3-001:005 and :011*. Keala Pono, LLC, Kaneohe.
McElroy, W.K., M. Elison, and R. Kapoi-Keliʻi
2013 *Archaeological Assessment for Improvements to Duke Maliu Regional Park, Kaunakakai Ahupuaʻa, Kona District, Island of Molokaʻi.* Keala Pono, LLC, Kaneohe.
McElroy, W.K., and S. Eminger
2015a *Archaeological Inventory Survey for Flood Control Levees in Kaunakakai Ahupuaʻa, Kona District, Island of Molokaʻi, Hawaiʻi TMK: (2) 5-3-005:006 (Por.), :008 (Por.) and :010 (Por.), (2) 5-3-003:015 (Por.), (2) 5-3-002:022 (Por.) and :024 (Por.).* Keala Pono, LLC, Kaneohe.
2015b *Archaeological Monitoring Report for Flood Control Levee Borings in Kaunakakai Ahupuaʻa, Kona District, Island of Molokaʻi Hawaiʻi.* Keala Pono, LLC, Kaneohe.
McElroy, W.K., M. Pinsonneault, and L. Medina
2024 *Archaeological Inventory Survey for the Kahului Civic Center Mixed-Use Complex Project, Wailuku Ahupuaʻa, Wailuku District, Island of Maui, Hawaiʻi, TMK: (2) 3-7-004:003 (Por.).* Keala Pono Archaeological Consulting, LLC, Kāneʻohe.
McGerty, L., and M.T. Carson
1999 *An Archaeological Inventory Survey Within a Portion of Drainage System A, Kaunakakai, Island of Molokaʻi, Hawaiʻi (TMK 5-03-02: 72; 5-3-63: 01; 5-3-09:17).* Scientific Consultant Services, Inc., Honolulu.
McGerty, L., and R.L. Spear
1999 *An Inventory Survey of an Additional Unsurveyed Portion of TMK: 2-4-57:1, Land of Waiākea, South Hilo District, Island of Hawaiʻi*. Scientific Consultant Services, Inc., Honolulu.
2006 *An Archaeological Assessment Report for an Approximately 5-Acre Parcel in Kaunakakai Ahupuaʻa, Molokaʻi Island, Hawaiʻi [TMK: 5-03-003: Par. 15].* Scientific Consultant Services, Inc., Honolulu.
McGuire, K., and H.H. Hammatt
2000 *Archaeological Monitoring Report for the Kaunakakai Drainage System "A", Kaunakakai Molokai (TMK 5-3-2: Por. 72; 5-3-3: Por. 1; 5-3-5: Por. 8, 5-3-9: Por. 7, Por. 17, Por. 18. Por.22).* Cultural Surveys Hawaiʻi, Inc., Kailua.

McIntosh, J.D., C.C. Fechner, and P.L. Cleghorn
2020 *Archaeological Inventory Survey for the Proposed Improvements to the Department of Hawaiian Home Lands Water System on Molokaʻi Lands in Pālāʻau, Hoʻolehua, Nāʻiwa, Kahanui, and Kalamaʻula Ahupuaʻa Kona District, Island of Molokaʻi [TMK (2) 5-2-002:999; (2) 5-2-005:999; (2) 5-2-006:999; (2) 5-2-007:029, 030, 035, 039, 040, 055, 076-080, 082-085, 090, 999; (2) 5-2-008:001, 002, 004-006, 029, 043, 044, 046, 079, 084, 086, 091, 099, 102, 122, 123, 999; (2) 5-2-009:012, 016, 018, 026, 999; (2) 5-2-010:001-004, 007; (2) 5-2-012:034, 035, 999; (2) 5-2-013:010, 020, 021; (2) 5-2-021:999; (2) 5-2-023:009; (2) 5-2-024:999; (2) 5-2-025:999; (2) 5-2-032:068, 070; and (2) 5-2-033:047-053, 058, 061]*. Pacific Legacy, Inc., Kailua.

McMahon, N., and W. Tolleson
2015 *An Archaeological Assessment with Subsurface Testing of the Proposed Kauai Philippine Cultural Center Ahupua'a of Nāwiliwili, Moku of Līhu'e, Island of Kaua'i, TMK: (4) 3-3-003: 043*. Exploration Associates, LTD, Lihue.

Medina, L., and H.H. Hammatt
2015 *Archaeological Monitoring Report for the Hanua Street Containment Cap and Barrier Project, James Campbell Industrial Park, 91-008 Hanua Street, Kapolei, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu TMK: (1) 9-1-026:026.* Cultural Surveys Hawaiʻi, Inc., Kailua.

Medrano, S., and M.F. Dega
2013 *An Archaeological Monitoring Report for the Duke Maliu Regional Park Project Kaunakakai Ahupuaʻa, Kona District Molokaʻi Island, Hawaiʻi (TMK 5-3-003:012).* Scientific Consultant Services, Inc., Honolulu.

Monahan, C.M., and J. Powell
2005 *An Archaeological Monitoring Report During Phase II of the Kauaʻi Rural Fiber Optic Duct Lines Project, Kauaʻi Island, Hawaiʻi [TMK: (4) 1, 2, 3]*. Scientific Consultant Services, Inc., Honolulu.

Morrison, B.
1993 *Kilohana National Register of Historic Places Inventory Nomination Form*. Boone Morrison Architects, Inc., Volcano.

Muise, K.E., and R.B. Rechtman
2008 *Archaeological Monitoring Report for the Marine Landing and Kalamaula to Alii Fishpond Terrestrial Sections of Sandwich Isles Communications, Inc.'s Molokai Rural Fiber Optics Duct Lines Project*. Rechtman Consulting, LLC, Hilo.

Nelson, J.D., T. Gotay, and R.B. Rechtman
2017 *Archaeological Monitoring Report for Kapi'olani Street Extension Project TMKs: (3) 2-4-001:019 (Por.), 024 (Por.), 120 (Por.), 167 (Por.), 179 (Por.), 181,182, and 183 (Por.); (3) 2-4-023: 022 (Por.) and 023 (Por.); (3) 2-4-028:014 (Por.) and 032 (Por.); (3) 2-4-056:014 (Por.), 015 (Por.), 021 (Por.), 022 (Por.), 028 (Por.), 029, and 030 (Por.); and (3) 2-4-057:024 (Por.) Waiakea Ahupuaʻa, South Hilo District, Island of Hawaii*. ASM Affiliates, Hilo.

Neves, P.
1992 *National Register of Historic Places Inventory Nomination Form Kamehameha Hall*.

Nogelmeier, M.P.
2006 *The Epic Tale of Hiʻiakaikapoliopele: Woman of the Sunrise, Lighting-Skirted Beauty of Halemaʻumaʻu*. Awaiaulu, Honolulu.

Palama, S.L.
1973 *An Archaeological Reconnaissance of a Portion of the New Kauaʻi Community College at Puhi, Haʻiku Ahupuaʻa, Island of Kauaʻi. Project 14-16*. Archaeological Research Center Hawaiʻi, Lāwaʻi.

Penkiunas, D.
1992 *National Register of Historic Places Registration Form 10-900 for Henry Perrine Baldwin High School*.
Perzinski, D., and M.F. Dega
2011 *An Archaeological Monitoring Report for the County Cesspool Replacement Project at the War Memorial Park and Baseball Field Complex in Wailuku, Wailuku Ahupuaʻa, Wailuku District, Maui Island, Hawaiʻi [TMK (2) 3-08-07:055 Por.].* Scientific Consultant Services, Inc., Honolulu.
Perzinski, D., J. Winieski, and H.H. Hammatt
2001 *Archaeological Monitoring Report for Soil Testing Associated with a Proposed Waterline Replacement Project in Paukukalo, Wailuku Ahupuaʻa on Kainalu, Kaikoo, and Ukali Streets, and Lipo, Lilihua, and Kanai Places, Island of Maui (TMK 3-4-27, 29, 29).* Cultural Surveys Hawaiʻi, Inc., Kailua.
Pukui, M.K., S.H. Elbert, and E.T. Mookini
1974 *Place Names of Hawaii. Revised Edition*. University of Hawaiʻi Press, Honolulu.
Pukui, M.K., S.H. Elbert, and Et.T. Mookini
1986 *Hawaiian Dictionary. Revised Edition*. University of Hawaiʻi Press, Honolulu.
Rechtman, R.B.
2000 *Archaeological Monitoring for the Lower Main Street Jack in the Box Restaurant Land of Wailuku, Wailuku District Island of Maui (TMK: 2-3-4-043:01,02).* Paul H. Rosendahl, Ph.D., Inc., Hilo.
2009 *Archaeological Assessment Survey for the Proposed Hilo Bayfront Trails Project, Piʻihonua, Punahoa, Pōnāhawai, Kūkūau, and Waiākea Ahupuaʻa, South Hilo District, Island of Hawaiʻi.* Rechtman Consulting, LLC, Hilo.
Rechtman, R.B., and J.D. Henry
1998 *University of Hawaiʻi-Hilo Kāwili Street Development Archaeological Inventory Survey (TMK: 3-2-4-01:5), Waiākea Ahupuaʻa, South Hilo District, Island of Hawaiʻi*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
Robins, J.J., and R.L. Spear
1996 *An Inventory Survey of the Puanaiko Street Realignment/Extension Project Expanded Corridor, Waiakea, Kukuau 1–2, and Ponahawai, South Hilo District, Island of Hawaii.* Scientific Consultant Services, Inc., Honolulu.
Rosendahl, M.L.K.
1988 *Archaeological Reconnaissance Survey for Environmental Impact Statement (EIS) Hilo Wastewater Treatment Facility Site, Land of Waiakea, District of South Hilo, Island of Hawaii (TMK: 2-1-13: Por. 12, 13, 20, 22).* Paul H. Rosendahl, Ph.D., Inc., Hilo.
Rosendahl, P.H.
1989 *Addendum Report: Archaeological Inventory Survey of Eight Additional Areas Grove Farm Lihuʻe/Puhi Project Area*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
Royalty, Z.D., and H.H. Hammatt
2017 *Archaeological Monitoring Report for the Main Street and Kaʻahumanu Avenue Resurfacing Project from High Street to Hobron Avenue Wailuku Ahupuaʻa, Wailuku District, Maui Island TMK(s): [2] 3-4-001, 011, 012, 013, 018, and 042, [2] 3-7-002, 003, 004, 008, 010, and 011, and [2] 3-8-007 and 046, Kaʻahumanu Avenue and Main Street ROWs.* Cultural Surveys Hawaiʻi, Inc., Kailua.
Runyon, R., H.H. Hammatt, and D.W. Shideler
2012 *Draft Archaeological Assessment for a Chevron Products Company, Solar Site at James Campbell Industrial Park, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu [TMK: (1) 9-1-031:002 Por.].* Cultural Surveys Hawaiʻi, Inc., Kailua.

Sato, H.H., W. Ikeda, R. Paeth, R. Smythe, and M. Takehiro Jr.
1973 *Soil Survey of the Island of Hawaii, State of Hawaii*. United States Department of Agriculture, Soil Conservation Service, Washington, Washington D.C.
Schilz, A.J., and J. Landrum
1996 *Archaeological Test Excavations at the Shipboard Electronic Systems Evaluation Facility (SESEF) Shorebased Site, MILCON P-369 U.S. Coast Guard Station, Barbers Point, ʻEwa District, Oʻahu, Hawaiʻi (TMK 9-1-26-2).* Ogden Environmental, Honolulu.
Schleck, R.J., and N.E. Napoka
1979 *National Register of Historical Places Inventory Nomination Form Grove Farm Company Locomotives. Grove Farm Homestead, Lihue*.
Shun, K.
1982 *Archaeological Reconnaissance Survey and Test Excavations of the Wastewater Treatment Facility Area, Kaunakakai, Molokai TMK 5-3-05:2.* Bishop Museum, Honolulu.
Sinoto, A.
1978 *Cultural Reconnaissance of Manele Bay Dredged Material Disposal Site, Palawai, Island of Lanai, Hawaii*. Bishop Museum, Honolulu.
Soehren, L.
1964 *Report on Fieldtrip to Manele Bay, Lanai.* Bishop Museum, Honolulu.
Soltz, A., D.W. Shideler, and H.H. Hammatt
2014 *Archaeological Inventory Survey for the Kauai Beach Resort Overflow Parking Project Hanamāʻulu Ahupuaʻa, Līhuʻe District, Kauaʻi TMK: [4] 3-7-003: 017 Por*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Spangler, G.S., S.A. Belluomini, and H.H. Hammatt
2020 *Archaeological Monitoring Report for the Kapolei Corporation Yard, Kalaeloa, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu TMK: [1] 9-1-026:004*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Spear, R.L.
1995 *Data Recovery Excavations for Sites 50-10-35-19431, 19432, 19433, and 19434, Land of Waiakea, South Hilo District, Island of Hawaiʻi [TMK:2-4-57:01].* Scientific Consultant Services, Inc., Honolulu.
Sprouse, K.M., T.L. Lee-Greig, and H.H. Hammatt
2013 *An Archaeological Monitoring Report for the DAGS/ICSO Infrastructure Project at the Kaunakakai Civic Center, Kaunakakai Ahupuaʻa, Molokaʻi District, Molokaʻi Island, [TMK: (2) 5-3-005: 010, 012, 013, & 014).* Cultural Surveys Hawaiʻi, Inc., Wailuku.
Sterling, E.P.
1998 *Sites of Maui*. Bishop Museum Press, Honolulu.
Stine, C., D. Shideler, and H.H. Hammatt
2014 *Archaeological Monitoring Report for the Molokai Hazmat Project for Kaunakakai Harbor Ferry System Improvements Kaunakakai Ahupuaʻa, Molokai, Hawaiʻi TMK [2] 5-3-001 (Various Parcels).* Cultural Surveys Hawaiʻi, Inc., Kailua.
Stokes, J.F.G.
1909 *Heiau of Molokai. Molokai Survey* Field Note Book. Manuscript. Bishop Museum, Honolulu.
Summers, C.
1971 *Molokaʻi: A Site Survey*. Pacific Anthropological Records No. 14. Bishop Museum, Honolulu.
Swift, J.A., E.M. Sroat, E.R. Irvine, S.G.D. Albuquerque, C.C. Fechner, J.D. McIntosh, J.L. Panuska, and M.A. Mulrooney
2025 *Cultural Impact Assessment and Ka Paʻakai Analysis for the Hawaiian Islands Fiber Link Project with Cable Landing Sites on Kauaʻi, Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Islands, [TMK: (1) 9-1-026:027; (1) 9-1-026:999 (Olaʻi Street ROW); (2) 3-7-001:021 (Por.); (2) 3-7-001:022 (Por.); (2) 3-7-001:999 (Kahului Beach Road ROW); (2) 3-8-007:001 (Por.);*

(2) 3-8-007:040 (Por.); (2) 4-9-017:006 (Por.); (2) 4-9-017:027 (Por.); (2) 5-3-001:003 (Por.); (2) 5-3-001:011 (Por.); (2) 5-3-003:013 (Por.); (2) 5-3-003:014 (Por.); (2) 5-3-003:999 (Alanui Kaimike Street ROW); (3) 2-1-009:001 (Por.); (3) 2-1-009:041 (Por.); (3) 2-1-011:004 (Por.); (3) 2-1-011:005 (Por.); (3) 2-1-011:010 (Por.); (3) 2-4-001:167 (Por.); (4) 3-4-007:003 (Por.); (4) 3-7-003:007 (Por.); (4) 3-7-003:017 (Por.); and (4) 3-7-003:999 (Kūhiō Highway ROW)]. Pacific Legacy, Inc., Kailua.

Tetra Tech

2025a *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - Kaua'i Cable Landing Site*. Tetra Tech, Honolulu.

2025b *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - O'ahu Cable Landing Site*. Tetra Tech, Honolulu.

2025c *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - Maui Cable Landing Site*. Tetra Tech, Honolulu.

2025d *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - Molokai Cable Landing Site*. Tetra Tech, Honolulu.

2025e *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - Lāna'i Cable Landing Site*. Tetra Tech, Honolulu.

2025f *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - Hawai'i Island Cable Landing Site*. Tetra Tech, Honolulu.

Titchenal, P.

1998 *Archaeological Monitoring of Utility-Trench Excavations During Phase 1 Construction of Malama Cultural Park Kaunakakai, Moloka'i (TMK 5-3-01: 02, Portion of 03, 05, 97, 99, 100)*. Aki Sinoto Consulting, Honolulu.

Tome, G., and M.F. Dega

2005 *An Archaeological Assessment of 0.76-Acres in Wailuku, Wailuku Ahupua'a, Wailuku District, Island of Maui, Hawai'i [TMK: 3-8-37:28].* Scientific Consultant Services, Inc., Honolulu.

Tomonari-Tuggle, M., D. Tuggle, and S. Athens

2000 *Archaeology on a South Coast Landscape: Hulopo'e Lanai Volume I: Background, Summary, and Synthesis.* International Archaeological Research Institute, Inc., Honolulu.

Tuggle, H.D.

1993 *Malama Platform Archaeology: 1992 Excavations for Cultural Park Planning*. International Archaeological Research Institute, Inc., Honolulu.

Turner, W.

1981 Hawaiians Fight to Save Pristine Area. *The New York Times*. https://www.nytimes.com/1981/04/29/us/hawaiians-fight-to-save-pristine-area.html.

University of Hawai'i Maui College

2025 *History*. University of Hawai'i Maui College, Kahului.

U.S. National Archives and Records Administration

1941 "Puupehe, Lanai, T.H." *The American Landscape Collection: Historical Photograph Files*. Photograph No. 23938205. Washington D.C.

Wahl, M.

2021 *Honouliuli Ahupua'a: A History of the Largest Land Division on Hawai'i's Island of O'ahu*. ArcGIS Story Map. https://storymaps.arcgis.com/stories/508c78cb5f5b4f6ba9846f62de0ec4db.

Walker, A.T., L. Kalima, and S.T. Goodfellow

1991 *Archaeological Inventory Survey, Lihu'e/Puhi/Hanamā'ulu Master Plan, Lands of Hanamā'ulu, Kalapaki, Nāwiliwili, Niumalu, and Wailua, Līhu'e District, Island of Kaua'i.* Paul H. Rosendahl, Ph.D., Inc., Hilo.

Walker, A.T., and P. Rosendahl
1988 *Archaeological Surface and Subsurface Inventory Survey at a Grove Farm Līhu'e/Puhi Project Area*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
Walker, W.M.
1931 *Archaeology of Maui*. Unpublished Manuscript. Bishop Museum, Honolulu.
Weisler, M.
1989 *Archaeological Investigations of the Kaunakakai Field System, South-Central Moloka'i*. Archaeological Consulting and Research Services, Seattle.
Wilkinson, S., A. Mitchell, and H.H. Hammatt
2010 *Archaeological Literature Review and Field Inspection for the Proposed Kumau Street Entrance Improvements, Pier 4, Hilo Harbor, Waiākea Ahupua'a, South Hilo District, Island of Hawai'i, TMK: (3) 2-1-007:999*. Cultural Surveys Hawai'i, Inc., Kailua.
Wilson Okamoto Corporation
2012 *Environmental Assessment and Finding of No Significant Impact, Kauai Community College Redesignation to Urban District*. Wilson Okamoto Corporation, Honolulu.
Yorck, J., R. Chiogioji, and H.H. Hammatt
2004 *Archaeological Inventory Survey of the Approximately 34-Acre Radisson Kaua'i Beach Resort Parcel at Hanama'ulu Kaua'i (TMK 3-7-03:7).* Cultural Surveys Hawai'i, Inc., Kailua.
Ziegler, A.C.
2002 *Hawaii Natural History, Ecology, and Evolution*. University of Hawai'i Press, Honolulu.

APPENDIX I
CULTURAL IMPACT ASSESSMENT AND KA PA‘AKAI ANALYSIS

Pacific Legacy

Historic Preservation

DRAFT

CULTURAL IMPACT ASSESSMENT AND KA PA‘AKAI ANALYSIS FOR THE HAWAIIAN ISLANDS FIBER LINK PROJECT WITH CABLE LANDING SITES ON KAUA‘I, O‘AHU, MAUI, MOLOKAI, LĀNA‘I, AND HAWAI‘I ISLANDS

[TMK: (1) 9-1-026:027; (1) 9-1-026:999 (OLA‘I STREET ROW); (2) 3-7-001:021 (POR.); (2) 3-7-001:022 (POR.); (2) 3-7-001:999 (KAHULUI BEACH ROAD ROW); (2) 3-8-007:001 (POR.); (2) 3-8-007:040 (POR.); (2) 4-9-017:006 (POR.); (2) 4-9-017:027 (POR.); (2) 5-3-001:003 (POR.); (2) 5-3-001:011 (POR.); (2) 5-3-003:013 (POR.); (2) 5-3-003:014 (POR.); (2) 5-3-003:999 (ALANUI KAIMIKE STREET ROW); (3) 2-1-009:001 (POR.); (3) 2-1-009:041 (POR.); (3) 2-1-011:004 (POR.); (3) 2-1-011:005 (POR.); (3) 2-1-011:010 (POR.); (3) 2-4-001:167 (POR.); (4) 3-4-007:003 (POR.); (4) 3-7-003:007 (POR.); (4) 3-7-003:017 (POR.); AND (4) 3-7-003:999 (KŪHIŌ HIGHWAY ROW)]



CULTURAL RESOURCES CONSULTANTS

Hawai‘i Office:
Kailua, O‘ahu

California Offices:
Bay Area
Sierra/Central Valley
Business Office

Pacific Legacy: Exploring the past, informing the present, enriching the future.

This page intentionally left blank

DRAFT

CULTURAL IMPACT ASSESSMENT AND KA PAʻAKAI ANALYSIS FOR THE HAWAIIAN ISLANDS FIBER LINK PROJECT WITH CABLE LANDING SITES ON KAUAʻI, OʻAHU, MAUI, MOLOKAI, LĀNAʻI, AND HAWAIʻI ISLANDS

[TMK: (1) 9-1-026:027; (1) 9-1-026:999 (OLAʻI STREET ROW); (2) 3-7-001:021 (POR.); (2) 3-7-001:022 (POR.);(2) 3-7-001:999 (KAHULUI BEACH ROAD ROW); (2) 3-8-007:001 (POR.); (2) 3-8-007:040 (POR.); (2) 4-9-017:006 (POR.); (2) 4-9-017:027 (POR.); (2) 5-3-001:003 (POR.); (2) 5-3-001:011 (POR.); (2) 5-3-003:013 (POR.), (2) 5-3-003:014 (POR.); (2) 5-3-003:999 (ALANUI KAIMIKE STREET ROW); (3) 2-1-009:001 (POR.); (3) 2-1-009:041 (POR.); (3) 2-1-011:004 (POR.); (3) 2-1-011:005 (POR.), (3) 2-1-011:010 (POR.); (3) 2-4-001:167 (POR.); (4) 3-4-007:003 (POR.); (4) 3-7-003:007 (POR.); (4) 3-7-003:017 (POR.); AND (4) 3-7-003:999 (KŪHIŌ HIGHWAY ROW)]

Prepared by:

Jillian A. Swift, Ph.D.,
Ena M. Sroat, B.A.,
Emmaline R. Irvine, M.A.,
Samara G.d. Albuquerque, B.A.,
Caleb C. Fechner, B.A.,
James D. McIntosh, B.A.,
Joseph L. Panuska, B.A.,
and
Mara A. Mulrooney, Ph.D.

Pacific Legacy, Inc.
146 Hekili Street, Suite 205
Kailua, HI 96734
(808) 263-4800

Prepared for:

Tetra Tech
737 Bishop Street, Suite 2000
Honolulu, HI 96813

January 2026

ACKNOWLEDGEMENTS

The success of a Cultural Impact Assessment and Ka Paʻakai Analysis is reliant on the contributions of *kūpuna*, cultural practitioners, and other knowledge bearers who give so generously, not only with their time, but also with their *ʻike* and *manaʻo* to this process. The information shared in this document reflects generations of knowledge and understandings of the environmental, cultural, and spiritual significance of *wahi pana* throughout the Hawaiian Islands. They have shared information that is vital for understanding a protecting the valued cultural resources and traditional practices, past and present, within both the terrestrial and marine portions of Hanamāʻulu, Niumalu, Honouliuli, Wailuku, Kaunakakai, Pālāwai, and Waiākea Ahupuaʻa. Pacific Legacy is grateful to those who have taken part in this process, and we have tried our best to honor what they have shared. We apologize for any errors in names, content, or presentation. We are grateful to Jan TenBruggencate, on behalf of the Kaiola Canoe Club, for providing comments that helped us to better understand the use of the Nukoliʻi Beach area by current ocean recreators. We would also like to thank Grove Farm Museum and Julian Ako for providing referrals, which helped us to expand our consultation network for Kauaʻi and improved the quality of this document. We thank Mana Cáceres, Ulukoa Duhaylonsod, and Glen Kila for sharing information about the storied cultural landscape of Honouliuli and for teaching us about deep significance of the *kālua* that dot the landscape in Kalaeloa. We thank May-Lindsey Kalikolani Correa, Lani Maʻa Lapilio, Kawika McKeague, and Kuʻupua Kiyuna Mossman for offering to forward information to other individuals who are knowledgeable about Honouliuli. In Wailuku Ahupuaʻa, we thank Roselle Bailey for sharing her time and knowledge about traditional Hawaiian foodways, and for expressing her concerns about how the project may impact the environment around Kahului Harbor. We also thank Kalei Luʻuwai, Carmela Noneza, and the Hawaiian Canoe Club for their responses to our outreach in Wailuku. On Molokai, we are grateful to Teave Heen and Sheron Sasada for sharing information about the great significance of the marine environment and valued cultural practices in Kaunakakai, Molokai. We thank Kimberly Lani, Sybil Lopez, and Andrea Talon for providing referrals or offering to share information with others on Molokai. We express our thanks to Kepā Maly for sharing a wealth of resources and his years of research with us regarding the area of Mānele Bay on Lānaʻi. We thank Pamela Alconcel, Glen Kila, Benjamin Ostrander, Shelly Kaleialoha Preza, and Diane Preza for sharing knowledge about Mānele. On Hawaiʻi Island, we would like to thank Lokelani Brandt, Dr. Halena Kapuni-Reynolds, Dr. Lehua Veincent, and members of the Keaukaha Community Association for sharing their *ʻike* and *manaʻo*. Aislen Bacalso, Shola Kahiapo-Trevino, Michael Kaleikini, Larry Kimura, and Kialoa K. K. Mossman also provided information and referrals, which helped us expand our consultation network and improve the quality of this document.

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 Purpose and Legal Context 1
1.2 Project Background and Description 4
1.3 CIA Study Area, Background, and Environment 7
1.3.1 Kauaʻi Cable Landing Site 7
1.3.2 Oʻahu Cable Landing Site 14
1.3.3 Maui Cable Landing Site 18
1.3.4 Molokai Cable Landing Site 22
1.3.5 Lānaʻi Cable Landing Site 26
1.3.6 Hawaiʻi Island Cable Landing Site 30

2.0 METHODS 37

2.1 Archival and Background Research 37
2.2 Consultation 37
2.2.1 Scoping and Community Outreach 37

3.0 ARCHIVAL AND BACKGROUND RESEARCH 39

3.1 Kauaʻi Cable Landing Site 39
3.1.1 Significant Place Names 39
3.1.2 Moʻolelo 46
3.1.3 ʻŌlelo Noʻeau 54
3.1.4 Settlement and Land Use 55
3.1.5 Early Post-Contact Period 56
3.1.6 The Mahele 59
3.1.7 Sugarcane Agriculture 62
3.1.8 20th Century Developments 77
3.1.9 Previous Consultation for Nearby Projects in Hanamāʻulu and Niumalu Ahupuaʻa 91
3.1.10 Previous Archaeology 92
3.1.11 Summary of Archival and Background Research for the Kauaʻi Cable Landing Site 104
3.2 Oʻahu Cable Landing Site 106
3.2.1 Significant Place Names 106
3.2.2 Moʻolelo 111
3.2.3 ʻŌlelo Noʻeau 114
3.2.4 Settlement and Land Use 116
3.2.5 Early Post-Contact Period 119
3.2.6 The Mahele 125
3.2.7 Honouliuli Ranch 127
3.2.8 Ewa Plantation 132
3.2.9 The Oʻahu Railway & Land Company 135
3.2.10 The Barbers Point Lighthouse 137
3.2.11 U.S. Military Occupation 141
3.2.12 Recent Development in Honouliuli 142
3.2.13 Previous Consultation for Nearby Projects in Honouliuli Ahupuaʻa 152
3.2.14 Previous Archaeology 153
3.2.15 Summary of Archival and Background Research for the Oʻahu Cable Landing Site 159
3.3 Maui Cable Landing Site 160

3.3.1 Significant Place Names 160
3.3.2 Moʻolelo 164
3.3.3 ʻŌlelo Noʻeau 169
3.3.4 Settlement and Land Use 171
3.3.5 Early Post-Contact Period 172
3.3.6 The Mahele 175
3.3.7 Commercial Sugarcane Agriculture in Wailuku 176
3.3.8 Transportation 184
3.3.9 Kahului Town 187
3.3.10 World War II 194
3.3.11 UH Maui College 195
3.3.12 Previous Consultation for Nearby Projects in Wailuku Ahupuaʻa 199
3.3.13 Previous Archaeology 200
3.3.14 Summary of Archival and Background Research for the Maui Cable Landing Site 209
3.4 Molokai Cable Landing Site 211
3.4.1 Significant Place Names 211
3.4.2 Moʻolelo 215
3.4.3 ʻŌlelo Noʻeau 217
3.4.4 Settlement and Land Use 218
3.4.5 Traditional Hawaiian Period 221
3.4.6 Early Post-Contact Period 222
3.4.7 The Mahele 223
3.4.8 Kamehameha V 224
3.4.9 Nineteenth Century Salt Works 228
3.4.10 Kaunakakai Harbor and Wharf 230
3.4.11 Kaunakakai Town 235
3.4.12 Molokai Education Center 236
3.4.13 Previous Consultation for Nearby Projects in Kaunakakai Ahupuaʻa 245
3.4.14 Previous Archaeology 247
3.4.15 Summary of Archival and Background Research for the Molokai Cable Landing Site 258
3.5 Lānaʻi Cable Landing Site 259
3.5.1 Significant Place Names 259
3.5.2 Moʻolelo 265
3.5.3 ʻOlelo Noʻeau 267
3.5.4 Settlement and Land Use 269
3.5.5 Post-Contact Transitions 275
3.5.6 The Mahele 276
3.5.7 The Mormon Mission and W.M. Gibson's Purchase of Pālāwai 279
3.5.8 Post-Contact Ranching and Land Use 282
3.5.9 Mānele Harbor 286
3.5.10 Previous Consultation Efforts in Pālāwai Ahupuaʻa 293
3.5.11 Previous Archaeology 293
3.5.12 Summary of Archival and Background Research for the Lānaʻi Cable Landing Site 303
3.6 Hawaiʻi Island Cable Landing Site 305
3.6.1 Significant Place Names 305
3.6.2 Moʻolelo 316
3.6.3 ʻŌlelo Noʻeau 323
3.6.4 Settlement and Land Use 326
3.6.5 Early Post-Contact Period 331

3.6.6 The Mahele 337
3.6.7 Commercial, Municipal, and Industrial Development in Hilo Bay 338
3.6.8 The Keaukaha Homestead Lands 347
3.6.9 From Cane Lots to Campus 358
3.6.10 Previous Consultation for Nearby Projects in Waiākea Ahupuaʻa 369
3.6.11 Previous Archaeology 369
3.6.12 Summary of Archival and Background Research for the Hawaiʻi Island Cable Landing Site 381

4.0 CONSULTATION RESULTS 383

4.1 Community Outreach Interviews and Results 383
4.1.1 Scoping and Community Outreach for the Overall Project 383
4.1.2 Kauaʻi Cable Landing Site 383
4.1.3 Oʻahu Cable Landing Site 384
4.1.4 Maui Cable Landing Site 388
4.1.5 Molokai Cable Landing Site 389
4.1.6 Lānaʻi Cable Landing Site 391
4.1.7 Hawaiʻi Island Cable Landing Site 392

5.0 SUMMARY AND RECOMMENDATIONS 400

5.1 Traditional Cultural Resources, Practices, and Beliefs Identified at Each Cable Landing Site Study Area 400
5.1.1 Kauaʻi Cable Landing Site 400
5.1.2 Oʻahu Cable Landing Site 401
5.1.3 Maui Cable Landing Site 402
5.1.4 Molokai Cable Landing Site 403
5.1.5 Lānaʻi Cable Landing Site 404
5.1.6 Hawaiʻi Island Cable Landing Site 405
5.2 Potential Impacts to Resources and Traditional and Customary Native Hawaiian Rights Identified at Each Cable Landing Site Study Area 407
5.2.1 Kauaʻi Cable Landing Site 407
5.2.2 Oʻahu Cable Landing Site 407
5.2.3 Maui Cable Landing Site 408
5.2.4 Molokai Cable Landing Site 408
5.2.5 Lānaʻi Cable Landing Site 408
5.2.6 Hawaiʻi Island Cable Landing Site 408
5.3 Potential Feasible Actions to be Taken to Reasonably Protect Native Hawaiian Rights at Each Cable Landing Site Study Area Identified by CIA Participants 409
5.3.1 Kauaʻi Cable Landing Site 409
5.3.2 Oʻahu Cable Landing Site 409
5.3.3 Maui Cable Landing Site 410
5.3.4 Molokai Cable Landing Site 411
5.3.5 Lānaʻi Cable Landing Site 411
5.3.6 Hawaiʻi Island Cable Landing Site 411

6.0 KA PAʻAKAI ANALYSIS 413

6.1 Traditional Cultural Resources, Practices, and Beliefs 413
6.2 Potential Impacts to Traditional Cultural Resources, Practices, and Beliefs 414
6.3 Measures to Reasonably Protect Traditional Cultural Resources, Practices, and Beliefs 415

7.0 CONCLUSION 417
7.1.1 Kauaʻi Cable Landing Site Study Area 417
7.1.2 Oʻahu Cable Landing Site Study Area 417
7.1.3 Maui Cable Landing Site Study Area 418
7.1.4 Molokai Cable Landing Site Study Area 418
7.1.5 Lānaʻi Cable Landing Site Study Area 419
7.1.6 Hawaiʻi Island Cable Landing Site Study Area 419
7.1.7 Overall Study Area 421
8.0 REFERENCES CITED 422
APPENDIX A 448
APPENDIX B 476
APPENDIX C 478

LIST OF FIGURES

Figure 1. Overview map of the Hawaiian Island Fiber Link Project, showing the proposed subsea cable route and six cable landing sites (Map courtesy Tetra Tech) 6
Figure 2. Location of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College on a USGS map. 9
Figure 3. Location of the Nukoliʻi Beach portion of the HIFL project area with TMK boundaries 10
Figure 4. Location of the Kauaʻi Community College portion of the HIFL project area with TMK boundaries. 11
Figure 5. Soil types within and around the Nukoliʻi Beach portion of the HIFL project area. 12
Figure 6. Soil types within and around the Kauaʻi Community College portion of the HIFL project area. 13
Figure 7. Location of the Oʻahu portion of the HIFL project area at Barbers Point Beach Park on a USGS map. 15
Figure 8. Location of the Oʻahu portion of the HIFL project area with TMK boundaries. 16
Figure 9. Soil types within and around the Oʻahu portion of the HIFL project area. 17
Figure 10. Location of the Maui portions of the HIFL project area at Kahului Harbor and UH Maui College on a USGS map. 19
Figure 11. Location of the Maui portions of the HIFL project area with TMK boundaries. 20
Figure 12. Soil types within and around the Maui portions of the HIFL project area. 21
Figure 13. Location of the Molokai portions of the HIFL project area at the Molokai Yacht Club and Molokai Education Center on a USGS map. 23
Figure 14. Location of the Molokai portions of the HIFL project area with TMK boundaries. 24
Figure 15. Soil types within and around the Molokai portions of the HIFL project area. 25
Figure 16. Location of the Lānaʻi portion of the HIFL project area at Mānele Harbor on a USGS map. 27
Figure 17. Location of the Lānaʻi portion of the HIFL project area with TMK boundaries. 28
Figure 18. Soil types within and around the Lānaʻi portion of the HIFL project area 29
Figure 19. Location of the Hawaiʻi Island portions of the HIFL project area at PACRC and UH Hilo on a USGS map. 32
Figure 20. Location of the PACRC portion of the HIFL project area with TMK boundaries. 33
Figure 21. Location of the UH Hilo portion of the HIFL project area with TMK boundaries. 34

Figure 22. Soil types within and around the PACRC portion of the HIFL project area. 35
Figure 23. Soil types within and around the UH Hilo portion of the HIFL project area. 36
Figure 24. Screenshot of the public notice posted to *Ka Wai Ola* in May 2025. 38
Figure 25. Significant place names in Hanamāʻulu Ahupuaʻa. 43
Figure 26. Significant place names in Niumalu Ahupuaʻa. 45
Figure 27. An 1833 Emerson map of Kauaʻi refers to some place names and geographical features. Note the presence of "Komooloa or Lihue" on the map in this year. 61
Figure 28. An 1872 J. Gay map depicting Lihue Plantation's lands in Wailua and Hanamāʻulu Ahupuaʻa. 67
Figure 29. An 1878 Government Survey map depicting Lihue Plantation (red arrow) and Grove Farm (orange arrow) sugarcane fields in the area of present-day Līhuʻe Town. Note the present-day Kaumualiʻi Highway depicted here as an unimproved road. 68
Figure 30. A 1903 Donn Hawaii Territory Survey map depicting a swamp at Nukoliʻi, a sugar mill (likely Hanamāʻulu Mill; green arrow) at the base of Kālepa, Lihue Mill in Nāwiliwili (red arrow), Ahukini (orange arrow) [Fairview] Hotel (blue arrow), and the S. Wilcox residence (the site of the future Grove Farm Museum; purple arrow). 69
Figure 31. A 1910 USGS map depicting Hanamāʻulu Sugar Mill (red arrow) at the base of Kālepa and Ahukini (orange arrow). Note the railroad tracks connecting the two. 70
Figure 32. A 1928 photograph of Puhi Camp (Grove Farm 2025). 71
Figure 33. A 1930 map of Puhi Camp by W.M. Moragne (Grove Farm 2025). 72
Figure 34. A 1950 USGS aerial photograph of the Kauaʻi Community College portion of the HIFL project area, showing a developed Puhi Camp and sugarcane fields. 73
Figure 35. A 1965 USGS aerial photograph of the Kauaʻi Community College portion of the HIFL project area, showing a developed Puhi Camp and sugarcane fields. 74
Figure 36. An aerial photograph of Puhi Camp in the 1970s, showing the camp and center of the plantation operations surrounded by sugarcane fields (Grove Farm 2025). 75
Figure 37. A 1978 USGS aerial photograph of the Kauaʻi Community College portion of the HIFL project area, showing the newly constructed campus and the demolition of some portions of Puhi Camp. 76
Figure 38. A ca. 1930s photograph of the Nukolii Dairy (red arrow), also known as the Lihue Plantation Dairy, at Nukoliʻi Beach (National Archives and Records Administration). 80
Figure 39. A U.S. Navy map published in 1935, depicting the emergency landing airfield at Lihue Dairy and an airfield in the location of the present-day Wailua Golf Course. 81
Figure 40. A 1941 aerial photograph of the "Lihue Dairy Field" showing the Nukolii Dairy (blue arrow), horse racetrack (orange), present-day Nukoliʻi Beach Park access (red arrow), the general area of the present-day Outrigger Kauaʻi Beach Resort & Spa (pink arrow), and what is likely the U.S. Marine Corps camp (green arrow) (National Archives and Records Management). 82
Figure 41. A 1950 USGS aerial photograph of the Nukoliʻi Beach portion of the HIFL project area. Note the Nukolii Dairy farmlands, which have extended into the northern fields, where the present-day Nukoliʻi Beach Park and Outrigger Kauaʻi Beach Resort & Spa are located. 83
Figure 42. A 1959 USGS aerial photograph of the Nukoliʻi Beach portion of the HIFL project area. Note that the area is relatively unchanged from the 1950 aerial image (Figure 41). 84
Figure 43. A 1963 USGS map showing development across southeastern Kauaʻi. Note the Nukolii Dairy (blue arrow) and Puhi Camp and associated cemetery (purple arrow). 85
Figure 44. A 1978 USGS orthophoto of southeastern Kauaʻi. Note the development in the vicinity of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College, as well as the urbanization of Līhuʻe Town. 86
Figure 45. A 1978 USGS aerial photograph of the Nukoliʻi Beach portion of the HIFL project area…87

Figure 46. A 1983 USGS map depicting urban development in the vicinity of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College, as well as Līhuʻe Town. 88
Figure 47. A 1996 USGS map depicting further development in the vicinity of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College, as well as Līhuʻe Town. Note the expansion of the present-day Outrigger Kauaʻi Beach Resort & Spa (red arrow) and Island School and the Kauaʻi Community College campus (orange arrow)..... 89
Figure 48. A 2000 USGS aerial photograph of the Nukoliʻi Beach portion of the HIFL project area. Note the completed present-day Outrigger Kauaʻi Beach Resort & Spa to the north of the project area. 90
Figure 49. Previous archaeological studies conducted within 0.5 miles of the Nukoliʻi Beach portion of the HIFL project area. 97
Figure 50. Previous archaeological studies conducted within 0.5 miles of the Kauaʻi Community College portion of the HIFL project area. 99
Figure 51. Previously identified historic properties within 0.5 miles of the Nukoliʻi Beach portion of the HIFL project area..... 101
Figure 52. Previously identified historic properties within 0.5 miles of the Kauaʻi Community College portion of the HIFL project area. 103
Figure 53. Map of significant place names in Honouliuli Ahupuaʻa..... 110
Figure 54. An 1825 map by Lieutenant C. Malden shows the Oʻahu portion of the HIFL project area located in the "uncultivated plain" of ʻEwa, with early post-Contact trails traversing the coastline and extending *mauka-makai*. 121
Figure 55. An 1899 map by T.D. Beasley showing the Oʻahu portion of the HIFL project area located in the area labeled "Coral Plain" with the trails depicted in Figure 54 now indicated as developed roads. 122
Figure 56. A 1959 map by Paul Rockwood depicting the trails of leeward Oʻahu as described by John Papa ʻĪʻī. 123
Figure 57. Portion of a 1902 Hawaii Territory Survey Map of Oʻahu Island showing plantation boundaries, early twentieth-century land use features, and a new *mauka-makai* road connecting the Barbers Point Lighthouse to the uplands. 124
Figure 58. Map of LCAs, Land Grants, and other post-Contact features in Honouliuli Ahupuaʻa identified through archival research. 126
Figure 59. An 1881 map by M.D. Monsarrat, showing Kalaeloa re-named as "Barbers Point," located in the same area as the Oʻahu portion of the HIFL project area. 129
Figure 60. An 1873 map by Alexander shows the "Govt. Road" running along the *mauka* portion of the ʻEwa Plain and the Oʻahu portion of the HIFL project area located at Kalaeloa, labeled "Lae Loa or Barbers Point." 130
Figure 61. A composite of 1927-1928 Army Air Corps aerial images show the dense *kiawe* forests in the Barbers Point area during this time, as well as Ewa Plantation fields under cultivation to the north. 131
Figure 62. A 1913 military survey map showing the Ewa Plantation expanded over much of the northern half of the ʻEwa Plain; the Oʻahu portion of the HIFL project area is located at the intersection of two *mauka-makai* trails. 133
Figure 63. A 1939 Ewa Plantation Co. map provides a visual of the extent of the Ewa Plantation Co., which expanded over much of the northern half of the ʻEwa Plain.; the Oʻahu portion of the HIFL project area is located at the western terminus of a U.S. Army road.. 134
Figure 64. A 1951 USGS aerial photo which shows the OR&L Railroad (upper right corner) and military features shortly after WWII. 139

Figure 65. A 1937 photograph of Barbers Point, titled “Barbers Point, Road West Side, Oahu, T.H.,” looking towards Pearl Harbor, showing the newly constructed concrete lighthouse (orange arrow), the U.S. Army Road, and the vast expanse of *kiawe* forest on the Honouliuli plains (U.S. National Archives and Records Administration 2025). 140
Figure 66. A 1968 USGS aerial photo showing incipient industrial development north of Barbers Point and the Oʻahu portion of the HIFL project area. 143
Figure 67. 1977 USGS aerial photograph showing the increasing industrial infrastructure north of Barbers Point and the Oʻahu portion of the HIFL project area. 144
Figure 68. A 1953 USGS map showing road alignments, the United States Coast and Geodetic Survey Observatory with a number of military features to the east of the Oʻahu portion of the HIFL project area. 145
Figure 69. A 1962 USGS map shows the continued development of Barbers Point and the persistence of military features. 146
Figure 70. A 1968 USGS map shows further development of Barbers Point including a raceway park *mauka* of the Oʻahu portion of the HIFL project area. 147
Figure 71. A 1983 USGS map shows further development of the industrial area north of Barbers Point and the Oʻahu portion of the HIFL project area. 148
Figure 72. A 1998 USGS map shows continued industrial development and the Coast Guard Reservation to the west of the Oʻahu portion of the HIFL project area 149
Figure 73. A 1993 NOAA aerial photo. Note the encroaching urban and industrial developments within former agricultural lands. 150
Figure 74. 2000 NOAA aerial photo showing dense industrial development north of Barbers Point and the Oʻahu portion of the HIFL project area 151
Figure 75. Previous archaeological investigations within a 0.5-mile radius of the Oʻahu portion of the HIFL project area 156
Figure 76. Previously identified historic properties within 0.5 miles of the Oʻahu portion of the HIFL project area. 158
Figure 77. Traditional place names in Wailuku Ahupuaʻa 163
Figure 78. An 1882 map by Monsarrat (RM 1261) showing LCAs primarily located to the northwest of the Maui portions of the HIFL project area. A portion of the project area lies within LCA 420 (not shown), awarded to Kuihelani 179
Figure 79. An 1879 map by Monsarrat, showing a relatively bare Kahului coastline during the early years of the sugar boom with the Maui portions of the HIFL project area depicted. 180
Figure 80. An 1893 map of the Spreckelsville Plantation. The “road across sand hills” runs through the northernmost portion of the Maui portions of the HIFL project area 181
Figure 81. A 1925 map of the *ʻili* of Kalua. The *mauka* portion of the Maui HIFL project area at UH Maui College was part of lands formerly owned by HC&S. 182
Figure 82. A selection of post-Contact features identified in Wailuku Ahupuaʻa, the majority of which are in some way related to the post-Contact sugarcane industry. 183
Figure 83. A 1924 USGS map, which features the “Kahului RR Co. Narrow Gauge” tracks connecting the agricultural fields throughout Wailuku with mills, canneries, and shipping facilities. 186
Figure 84. An 1881 map of Kahului Harbor. The “Old Road to Wailuku” and the “Railway to Wailuku” cross into the Maui portions of the HIFL project area. Note also the portion of the shoreline that “Breaks heavily at all times.” 189
Figure 85. A circa 1932-1942 photograph of Kahului Harbor showing the West and East breakwaters, wharf, and Kahului town (U.S. National Archives and Records Administration). 190
Figure 86. A 1941 map of Kahului Harbor. Kahului Beach Road crosses into the Maui portions of the HIFL project area. The west breakwater is also adjacent to the project area. 191

Figure 87. An 1896 map showing the early development of Kahului Town, including a lumber yard, office, warehouses, shops, and a custom house near the wharf. Much of this central area was burned when the plague hit Kahului in 1900. 192
Figure 88. A 1942 map of the geology and groundwater of Maui. The onshore parts of the Maui portions of the HIFL project area are entirely within calcareous sand dunes (Qd, depicted in red). 193
Figure 89. Aerial imagery from 1950 showing the Quonset huts that served as office and storage space for the 18th Service Battalion during WWII in relation to the Maui portions of the HIFL project area. 196
Figure 90. A 1955 USGS map depicts the "Maui Vocational School" to the southwest of the Maui portions of the HIFL project area. 197
Figure 91. Aerial imagery from 1965 showing the developed "lower campus" of Maui Community College in the vicinity of the Maui portions of the HIFL project area 198
Figure 92. Previous archaeological studies conducted within 0.5 miles of the Maui portions of the HIFL project area. 204
Figure 93. Previously identified historic properties within 0.5 miles of the Maui portions of the HIFL project area. 208
Figure 94. Traditional place names in Kaunakakai Ahupuaʻa. 213
Figure 95. Post-Contact place names in Kaunakakai Ahupuaʻa. 214
Figure 96. Map of the *loko iʻa* of Molokai, showing the fishponds strung along the leeward, or southern, coast of the island and concentrated in the southeastern portion (figure from Summers 1964:14) (Note: arrows indicate *ʻumeiki* type of fishponds, a style unique to Molokai) 219
Figure 97. An 1882 map by G.E.G. Jackson, showing the Kamehameha V compound to the southeast of the Molokai Yacht Club portion of the HIFL project area. The Kamehameha compound is bordered on the *mauka* side by an area of "Grassland" while a "Cattle Pen" enclosure is located to the northwest, which extends into the Molokai Yacht Club portion of the project area. 226
Figure 98. An 1886 map showing the Molokai portions of the HIFL project area within Kaunakakai Ahupuaʻa, with the Molokai Yacht Club portion located in the vicinity of the Kamehameha V compound (red arrow) and the walled Kaunakakai Town (orange arrow). 227
Figure 99. A 1912 photograph by R.J. Baker, titled "Molokai – (Beach) Kaunakakai," showing the coconut grove said to have been planted by Kamehameha V (Hawaiʻi State Digital Archives; Ref. No. PPWD-11-6-022) 229
Figure 100. Map showing Land Grants in Kaunakakai Ahupuaʻa, identified through archival research. 231
Figure 101. Survey map included within Royal Patent Grant 3533, showing the boundaries of Kaunakakai Ahupuaʻa (Royal Patent Grant No. 3533, available via the OHA Kīpuka Database). 232
Figure 102. Circa 1901 photograph of the Kaunakakai Salt Works (Dibben-Young in Pactol 2012). 233
Figure 103. A 1931 photograph of Kaunakakai Wharf (U.S. National Archives and Records Administration). 233
Figure 104. Circa 1918 photograph of George Cooke holding a fish on Kaunakakai Wharf; Note the narrow-gauge railroad tracks leading to the wharf loading platform (Hawaiʻi State Digital Archives; Ref. No. GPNBAK-1-26). 234
Figure 105. A 1924 USGS topographic map of Molokai, showing Kaunakakai Town located on the coastal plain and comprised of scattered dwellings with mainly unpaved streets (dashed lines). The wharf railroad track is depicted extending from the pier up to Kaunakakai Town 237

Figure 106. A 1943 photograph of Kaunakakai showing Kaunakakai town and wharf (U.S. National Archives and Records Administration 2025)..... 238
Figure 107. A 1947 topographic map showing Kaunakakai Town, with very little change from the 1924 map (see Figure 105). 239
Figure 108. A 1950 aerial photograph showing the Molokai Yacht Club portion of the HIFL project area located within undeveloped land to the west of Kaunakakai Wharf and the Molokai Education Center portion of the HIFL project area within an open field. 240
Figure 109. A 1952 topographic map showing increased habitation density within Kaunakakai Town. 241
Figure 110. A 1964 aerial photograph showing slight growth of Kaunakakai Town but more marked increased habitation on the *makai* side of Kamehameha V Highway. 242
Figure 111. A 1967 topographic map showing the increased density of Kaunakakai Town. 243
Figure 112. A 2000 aerial photograph showing the modern growth of Kaunakakai Town. The Molokai Education Center is now visible in the location of the Molokai Education Center portion of the HIFL project area, while the Molokai Yacht Club portion is adjacent to several small structures. The dredged break in the fringing reef at the location of Kaunakakai Wharf is clearly visible. 244
Figure 113. Locations of fishing sites recorded by Matsuoka 1994 in the vicinity of Kaunakakai Wharf (as cited in the Molokaʻi Climate Change and Sea Level Rise Adaptation and Resiliency (CCSLAR) Plan, 2024). 246
Figure 114. Previous archaeological studies within a 0.5-mile radius of the Molokai portions of the HIFL project area. 254
Figure 115. Previously identified historic properties within 0.5 miles of the Molokai portions of the HIFL project area. 257
Figure 116. Traditional place names located in Pālāwai Ahupuaʻa. 264
Figure 117. An 1878 map of Lānaʻi Island by J.F. Brown and M.D. Monsarrat. Note the expansive sands around Mānele, including within the Lānaʻi portion of the HIFL project area. 268
Figure 118. A portion of a 1903 Hawaiian Territorial Survey Map by F.E. Harvey with the Lānaʻi portion of the HIFL project area. 271
Figure 119. A 1927 map by F.E. Harvey is dense with significant place names and Land Commission Awards in Pālāwai and surrounding *ahupuaʻa*. 272
Figure 120. An undated map of Pālāwai Ahupuaʻa by an unknown surveyor. This map shows Kaupukuea [Kaupuakuea] as a line extending inland from Mānele Harbor. 273
Figure 121. A 1923 USGS map with elevation gradients highlights the nearby gulches and steep ridgeline leading into Pālāwai Basin 274
Figure 122. Map of LCAs, Land Grants, and other post-Contact features in Pālāwai Ahupuaʻa identified through archival research. 278
Figure 123. A 1954 USGS map showing the paved road leading from Mānele Bay to the uplands and Lanai City. This paved road was built on top of or near preexisting roads, including pre-Contact trail routes. 285
Figure 124. A 1941 photograph of Mānele Harbor, titled “Puupehe, Lanai, T.H.,” showing the largely unimproved landscape and the sand dunes connected Mānele Harbor (right) and Hulopoʻe Beach (left) (U.S. National Archives and Records Administration). 290
Figure 125. A 1984 USGS Map showing more recent developments around Mānele, including a Marine Life Conservation District and US Coast Guard Reservation. 291
Figure 126. A 1974 photograph of the Mānele Harbor Facility and Diversion Channel Site. The area of Site 157, which was impacted by the drainage diversion project, is located in the background, under the *kiawe* growth (photo courtesy of Kepā Maly). 292

Figure 127. Previous archaeological studies conducted within 0.5 miles of the Lānaʻi portion of the HIFL project area. 297
Figure 128. Previously identified historic properties within 0.5 miles of the Lānaʻi portion of the HIFL project area. 302
Figure 129. Traditional place names located in Waiākea Ahupuaʻa. 314
Figure 130. Traditional place names located along the coast and near the PACRC portion of the HIFL project area. 315
Figure 131. An 1870s map by Lyons showing significant place names and resources, including fishponds, trails, and the "hala woods" within Waiākea Ahupuaʻa. 330
Figure 132. Undated map by Lyons and Covington, showing various churches and other developments around Hilo Town. The presence of the "Mill" indicates the map postdates the establishment of the Waiakea Mill Company in 1879. 334
Figure 133. An 1825 map by Malden showing the recently re-named "Blonde Reef," and the developing Hilo Town. 335
Figure 134. An 1841 and 1856 map by Charles Wilkes showing Waiākea Harbor relative to the PACRC portion of the HIFL project area. 336
Figure 135. Map of LCAs and Land Grants in the vicinity of the Hawaiʻi Island portions of the HIFL project area in Waiākea Ahupuaʻa. 341
Figure 136. Significant landmarks and features in post-Contact Waiākea Ahupuaʻa. 342
Figure 137. Significant post-Contact landmarks and features along the coast. 343
Figure 138. A 1901 map by Donn showing nearby developments, including Waiakea Mill, Hilo Sugar Co. Mill, and the Hilo Railroad which transported milled sugar to the harbor. 344
Figure 139. A 1912 topographic map showing the expansion of the railroad and development around the Waiakea Mill and harbor areas. 345
Figure 140. Aerial image from 1965 showing the Hilo Sewage Treatment Plant at Puhi Bay with the PACRC portion of the HIFL project area overlaid. 346
Figure 141. A 1917 USGS map shows the prominence of the Waiakea Mill during this time, a developing Hilo Town, and limited settlement in the Keaukaha area. 352
Figure 142. A 1923 survey map of the Keaukaha House Lots, showing portions of lots 1 through 4 within the PACRC portion of the HIFL project area. 353
Figure 143. A 1927 map showing the subdivision of a portion of Hawaiian Home Lands in Keaukaha, and the PACRC portion of the HIFL project area within the lands set aside for Keaukaha Beach Park by Executive Order 421. 354
Figure 144. A 1932 USGS map shows increasingly dense settlement around Hilo, including the development of new subdivisions, Hawaiian Homesteads, and the Hilo Airport. 355
Figure 145. A 1938 map of the Hawaiian Home Lands in Keaukaha with the PACRC portion of the HIFL project area in lands set aside for a U.S. Military Reservation by Executive Order 176. . 356
Figure 146. A 1959 state survey map for the Waiakea Development Project showing Hawaiian Homes lots and post-war industrial development around the harbor with the PACRC portion of the HIFL project area. 357
Figure 147. An 1886 map by Wall showing the Waiakea Plantation lands during the early years of its operation, with competing mills scattered along the coast to the north. 360
Figure 148. A 1928 map by Wall, showing the UH Hilo portion of the HIFL project area under sugarcane cultivation and the nearby Waiakea Mill "Camp 2." 361
Figure 149. A 1930 map of railroad and flume rights of ways, showing the UH Hilo portion of the HIFL project area in a portion of Waiakea Cane Lots 5 and 15, and within Lanikaula St. 362
Figure 150. Map of Waiakea Pasture Land, showing the Waiakea Cane Lots to the west of the UH Hilo portion of the HIFL project area converted to pasture land (source: Maly et al. 1994). ... 363

Figure 151. Map of the proposed permanent home for the UH-Hilo branch. The final location remained at Lanikaula Street, though the parcel expanded to 37 acres (*Hawaii Tribune Herald*, December 18, 1953). 364
Figure 152. A drawing board preview of the UH-Hilo branch (*Hawaii Tribune Herald*, May 23, 1954). 365
Figure 153. A 1954 aerial image of the former cane fields that would become the permanent home of the UH Hilo campus the following year. 366
Figure 154. A 1965 aerial image of the UH Hilo campus with the UH Hilo portion of the HIFL project area. 367
Figure 155. A 1977 aerial image of Hilo showing the further developed UH Hilo campus. 368
Figure 156. Previous archaeological studies conducted within 0.5 miles of the PACRC portion of the HIFL project area. 371
Figure 157. Previous archaeological studies conducted within 0.5 miles of the UH Hilo portion of the HIFL project area. 374
Figure 158. Previously identified historic properties within 0.5 Miles of the PACRC portion of the HIFL project area. 376
Figure 159. Previously identified historic properties within 0.5 Miles of the UH Hilo portion of the HIFL project area. 380

LIST OF TABLES

Table 1. Place Names Associated with Hanamāʻulu Ahupuaʻa 41
Table 2. Place Names Associated with Niumalu Ahupuaʻa 44
Table 3. Previous Archaeological Studies within 0.5 Miles of the Nukoliʻi Beach Portion of the HIFL Project Area 95
Table 4. Previous Archaeological Studies within 0.5 Miles of the Kauaʻi Community College Portion of the HIFL Project Area 98
Table 5. Previously Identified Historic Properties within 0.5 Miles of the Nukoliʻi Beach Portion of the HIFL Project Area 100
Table 6. Previously Identified Historic Properties within 0.5 Miles of the Kauaʻi Community College Portion of the HIFL Project Area 102
Table 7. Place Names Associated with Honouliuli Ahupuaʻa 107
Table 8. Previous Archaeological Studies within 0.5 Miles of the Oʻahu Portion of the HIFL Project Area 154
Table 9. Previously Identified Historic Properties within 0.5 Miles of the Oʻahu Portion of the HIFL Project Area 157
Table 10. Place Names Associated with Wailuku Ahupuaʻa 161
Table 11. Previous Archaeological Studies within 0.5 miles of the Maui Portions of the HIFL Project Area 201
Table 12. Previous Archaeological Studies within 0.5 miles of the Maui Portions of the HIFL Project Area 205
Table 13. Place Names Associated with Kaunakakai Ahupuaʻa 211
Table 14. Previously Identified Historic Properties within 0.5 Miles of the Molokai Portions of the HIFL Project Area 250
Table 15. Previously Identified Historic Properties within 0.5 Miles of the Molokai Portions of the HIFL Project Area 255
Table 16. Place Names within Pālāwai Ahupuaʻa 261

Table 17. Land Claim Awards associated with Pālāwai Ahupuaʻa 277
Table 18. Summary of Previous Archaeological Studies Within 0.5 Miles of the Lānaʻi Portion of the HIFL Project Area 294
Table 19. Previously Identified Historic Properties Within 0.5 Miles of the Lānaʻi Portion of the HIFL Project Area 298
Table 20. Place Names Associated with Waiākea Ahupuaʻa 309
Table 21. Land Claim Awards Associated with Waiākea Ahupuaʻa 337
Table 22. Previous Archaeological Studies Within 0.5 Miles of the PACRC Portion of the HIFL Project Area 370
Table 23. Previous Archaeological Studies Within 0.5 Miles of the UH Hilo Portion of the HIFL Project Area 372
Table 24. Previously Identified Historic Properties Within 0.5 Miles of the PACRC Portion of the HIFL Project Area 375
Table 25. Previously Identified Historic Properties Within 0.5 Miles of the UH Hilo Portion of the HIFL Project Area 377
Table 26. Outreach Summary for the Overall HIFL Project Area CIA and Ka Paʻakai Analysis 450
Table 27. Outreach Summary for the Kauaʻi Portions of the HIFL Project Area CIA and Ka Paʻakai Analysis 455
Table 28. Outreach Summary for the Oʻahu Portion of the HIFL Project Area CIA 459
Table 29. Outreach Summary for the Kahului Harbor Portions of the HIFL Project CIA 463
Table 30. Outreach Summary for the Molokai Yacht Club portions of the HIFL Project Area CIA 467
Table 31. Outreach Summary for the Lānaʻi Portion of the HIFL Project Area CIA 471
Table 32. Outreach Summary for the Portion of the HIFL Project Area CIA on Hawaiʻi Island 474

Note: *In this report, the spellings and the use of diacritical marks (glottal stops and macrons) follow conventions issued by Pukui and Elbert (1986) and Pukui et al. (1974) with limited exceptions – spellings and diacritical marks are used as the original sources used them in quotations, titles, and proprietary names.*

Cover Image: *S.P. Kalama's Ahupuaʻa map of 1838, one of only two known maps created by a Hawaiian that show* ahupuaʻa *prior to the Māhele (Source: islandbreath.org).*

1.0 INTRODUCTION

At the request of Tetra Tech, Pacific Legacy, Inc. has prepared this Cultural Impact Assessment (CIA) and Ka Paʻakai Analysis for the Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system with cable landing sites located on Kauaʻi, Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Islands.

The HIFL Project involves construction, operation, and maintenance of an interisland fiber optic cable system to provide more robust, diverse, and reliable broadband connectivity across of the State of Hawaii. The Project would interconnect the six main Hawaiian Islands, with cable landing sites on Kauaʻi, Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Island. The subsea cable, which would have a maximum diameter of 1.1 inches, would be surface-laid on the seabed within State and U.S. Federal waters to interconnect the islands. At all six cable landing sites, horizontal directional drilling (HDD) would be used to install underground conduit to facilitate installation of the cable beneath the shoreline between the onshore facilities and an offshore punchout location in nearshore waters. Facilities on each island would include a beach manhole (BMH), terrestrial fiber optic cable, and a cable landing station (CLS) with associated cable termination and monitoring equipment.

The cable landing sites are located in the following areas: Kauaʻi: Hanamāʻulu and Niumalu Ahupuaʻa, Puna Moku (Modern District of Līhuʻe), [TMKs: (4) 3-4-007:003 (por.), (4) 3-7-003:007 (por.), (4) 3-7-003:017 (por.), and (4) 3-7-003:999 (Kūhiō Highway ROW)]; Oʻahu: Honouliuli Ahupuaʻa, ʻEwa District [TMK: (1) 9-1-026:027, (1) 9-1-026:999 (Olaʻi Street ROW)]; Maui: Wailuku Ahupuaʻa, Wailuku District [TMKs: (2) 3-7-001:021 (por.), (2) 3-7-001:022 (por.), (2) 3-7-001:999 (Kahului Beach Road ROW) (2) 3-8-007:001 (por.), (2) 3-8-007:040 (por.)]; Molokai: Kaunakakai Ahupuaʻa, Kona Moku (Modern District of Molokai) [TMKs: (2) 5-3-001:003 (por.); (2) 5-3-001:011 (por.); (2) 5-3-003:013 (por.), (2) 5-3-003:014 (por.), (2) 5-3-003:999 (Alanui Kaimike Street ROW)]; Lānaʻi: Pālāwai Ahupuaʻa, Lāhaina District [TMKs: (2) 4-9-017:006 (por.), (2) 4-9-017:027 (por.)]; and Hawaiʻi Island: Waiākea Ahupuaʻa, South Hilo District [TMKs: (3) 2-1-009:001 (por.), (3) 2-1-009:041 (por.), (3) 2-1-011:004 (por.), (3) 2-1-011:005 (por.), (3) 2-1-011:010 (por.), (3) 2-4-001:167 (por.)].

1.1 PURPOSE AND LEGAL CONTEXT

The CIA is a requirement of Act 50 (as cited in Article XII, Section 7 of the Hawaiʻi State Constitution; *Ka Paʻakai O Ka ʻĀina v. Land Use Commission,* 94 Hawaiʻi 31, 7 P.3d 1068 [Haw. 2000]; Act 50 SLH 2000) which amended Chapter 343 of the Hawaiʻi Revised Statutes (HRS) to require that environmental assessments (EA) or Environmental Impact Statements (EIS) consider potential effects on native Hawaiian cultural practices, and amends the definition of "significant effect" to include adverse effects on cultural practices. It explicitly acknowledges that Articles IX and XII of the Hawaiʻi State Constitution requires government agencies to "promote and preserve cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups" (Office of Environmental Quality Control 1997). These articles empower the state to conserve and develop objects and places of historic or cultural interest (as cited in Article IX, Section 7 of the Hawaiʻi State Constitution), and confers the power to preserve and develop the cultural, creative, and traditional arts of its various ethnic groups (as cited in Article IX, Section 9 of the Hawaiʻi State Constitution). In addition, Article XII, Section 7 (as cited in Article XII, Section 7 of the of the Hawaiʻi State

Constitution) of the State Constitution reaffirms the State's obligations to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by *ahupua'a* [traditional land division] tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights."

The Office of Environmental Quality Control (OEQC)'s Guidelines for Assessing Cultural Impacts, which were adopted by the State of Hawai'i Environmental Council in 1997, provide a structure for CIA methodology and reporting (OEQC 1997). They specify that the scope of the assessment should in most cases extend beyond the boundaries of the project area in order to account for cultural practices which may not necessarily take place within the project area but may still be impacted by development activities. In general, the *ahupua'a* is recommended as the appropriate scale of assessment, though in some cases, potential impacts of project activities may extend beyond the boundaries of a single *ahupua'a* and the scope should be widened accordingly (e.g., projects that pose potential impacts to watersheds or offshore resources). The OEQC offers the following guidance for the historical period and cultural resources subject to assessment:

> The historical period studied in a cultural impact assessment should commence with the initial presence in the area of the particular group whose cultural practices and features are being assessed. The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs.
>
> The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man made and natural, including submerged cultural resources, which support cultural practices and beliefs. (OEQC 1997:1)

They also stress that the presence of development, including urban infrastructure, does not preclude the existence of ongoing cultural practices, beliefs, and culturally-important resources. The following protocol is recommended by the Environmental Council for preparing Cultural Impact Assessments:

> (1) Identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupua'a;
> (2) Identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;
> (3) Receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;
> (4) Conduct ethnographic, historical, anthropological, sociological, and other culturally related documentary research;
> (5) Identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and
> (6) Assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified. (OEQC 1997:1-2)

A series of decisions by the Supreme Court of Hawai'i have further reaffirmed and clarified protections for native Hawaiian customary and traditional gathering rights.

Kalipi v. Hawaiian Trust Co., Ltd., 66 Hawai'i 1, 656 P.2d 745 (Haw. 1982) asserted that the right to enter "undeveloped lands to gather, without unnecessarily disturbing the surrounding environment, natural products necessary for certain traditional native Hawaiian practices" did not extend to individuals who do not actually reside within the land division in which they seek to exercise such rights. However, it also asserted that "any argument for the extinguishing of traditional rights based simply upon the possible inconsistency of purported native rights within our modern system of land tenure must fail" based on the constitutional obligations of the court to preserve and enforce traditional rights under Article XII of the Hawai'i State Constitution. This is the first case in which the Hawai'i Supreme Court recognized the modern legal bases of traditional customary rights.

In *Pele Defense Fund v. Paty*, 73 Hawai'i 578, 837 P.2d 1247 (Haw.1992), members of the Pele Defense Fund asserted native Hawaiian gathering rights in an *ahupua'a* other than the ones in which they reside. Although this assertion is similar to that made by Kalipi in 1982, in this instance the court ruled in favor of the Pele Defense Fund's gathering rights. They argued that where Kalipi's assertion was based entirely on land ownership, the Pele Defense Fund's assertion was based on access and gathering patterns that have been held traditionally by native Hawaiians in the Puna region. Therefore, the court determined that "native Hawaiian rights protected by article XII § 7 may extend beyond the ahupua'a in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner."

Public Access Shoreline v. Hawai'i County Planning Commission, 79 Hawai'i 425, 903 P.2d 1246 (Haw. 1995), commonly known as PASH, held that the Hawai'i Planning Commission is obligated to "preserve and protect" native Hawaiian rights to the extent feasible when issuing Special Management Area (SMA) Permits. The case clarified that native Hawaiian gathering rights extended to land that is less than fully developed, stating: "Although access is only *guaranteed* in connection with undeveloped lands, and article XII, section 7 does not *require* the preservation of such lands, the State does not have the unfettered discretion to regulate the rights of ahupua'a tenants out of existence." It further stated that although the reasonable exercise of native Hawaiian usage is entitled to protection under article XII, section 7, "the balance of interests and harms clearly favors a right of exclusion for private property owners as against persons pursuing *non-traditional* practices or exercising otherwise valid customary rights in an *unreasonable* manner."

Ka Pa'akai O Ka 'Aina v. Land Use Commission, 94 Hawai'i 31, 7 P.3d 1068 (Haw. 2000) found that the Land Use Commission (LUC) failed to fulfill its obligation to preserve and protect traditional and customary rights of native Hawaiians when it made the decision to reclassify nearly 1,010 acres of land in Ka'ūpūlehu Ahupua'a from conservation to urban use. The court found that the LUC improperly delegated these responsibilities to the developer:

> The power and responsibility to determine the effects on customary and traditional native Hawaiian practices and the means to protect such practices may not validly be delegated by the LUC to a private petitioner who, unlike a public body, is not subject to public accountability. Allowing a petitioner to make such after-the-fact determinations may leave practitioners of customary and traditional uses unprotected from possible arbitrary and self-serving actions on the petitioner's part. After all, once a project begins, the pre-project cultural resources and practices become a thing of the past. *(Ka Pa'akai O Ka 'Āina v. Land Use Commission*, 94 Hawai'i 31, 7 P.3d 1068 (Haw. 2000) 2000)

The court remanded the case to the LUC on a limited basis to enter specific findings of fact and conclusions of the law regarding:

1.) The identity and scope of "valued cultural, historical, or natural resources" in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area;
2.) The extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action; and
3.) The feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights if they are found to exist. (*Ka Pa'akai O Ka 'Āina v. Land Use Commission*, 94 Hawai'i 31, 7 P.3d 1068 (Haw. 2000) 2000)

Notably, in requiring these three specifications for findings of fact and conclusions, the court provided an analytical framework to help guide the state and its agencies in considering land use decisions and to "help ensure the enforcement of traditional and customary native Hawaiian rights while reasonably accommodating competing private development interests." This analytical framework has become commonly known as the "Ka Pa'akai Analysis."

1.2 PROJECT BACKGROUND AND DESCRIPTION

In recent years, high-speed internet (broadband) has emerged as critical infrastructure for functions including business and economic development, educational advancement, health care, social and civic engagement, governmental and public services, and national security. Fiber optic cable systems, which utilize lasers to transmit data signals through protected fiber optic strands, provide much higher total bandwidth than other technologies, and are currently the most robust and feasible method for high-speed transmission and distribution of broadband. In the State of Hawai'i, most of the broadband connectivity to and between the islands is provided via submarine fiber optic cable systems. However, there has been a lack of investment in this infrastructure, resulting in limited and aging assets which provide the critical link between the global internet and Hawai'i's residents. In addition to approaching retirement age, the existing systems also no longer meet the current and future bandwidth demands.

The HIFL Project is being proposed by the State of Hawaii, represented by the University of Hawai'i (UH) Vice President for Information Technology and Chief Information Officer (VPIT). UH has engaged Ocean Networks, Inc. (ONI) to address the supply, construction, operations and maintenance aspects of the Project, including the environmental review and permitting requirements. The purpose of the HIFL Project is to develop an interisland fiber optic cable system with diverse and strategically located cable landing sites to provide the infrastructure needed for robust and reliable broadband across the State of Hawai'i. The Project would include both marine and terrestrial components, with the marine component comprising approximately 416 miles of subsea fiber optic cable surface-laid on the seabed between the islands. The cable would have a maximum diameter of approximately 1.1 inches, with the deepest cables having a diameter about the width of a typical household garden hose (0.6 inches). The cable would be installed in five distinct segments spanning the nearshore state waters and surrounding federal waters, as needed to connect the six cable landing sites (Figure 1).

At all six cable landing sites, horizontal directional drilling (HDD) would be used to install underground conduit between the onshore area for each cable landfall and an associated offshore punchout location in the nearshore waters, thus allowing the subsea cable to make landfall while traversing beneath and avoiding impacts to the shoreline. The terrestrial components at each cable landing site would include a beach manhole (BMH), terrestrial fiber optic cable (terrestrial cable), and a cable landing station (CLS). The BMH would be an underground reinforced concrete vault

where the subsea cable would terminate and connect with the terrestrial cable. The terrestrial cable would extend from the BMH toward the CLS via underground conduit. In addition to the terrestrial cable, the Project would also utilize fiber on each island's existing utility system to reach the CLS. To the extent practicable, each CLS would be located on UH property, consisting of either space within an existing building or a new modular structure. The CLS would house the equipment needed to support subsea cable transmission and monitoring, as well as facilitate interconnection with the local telecommunications network.

Once installed, the HIFL system is expected to have an operational life of at least 25 years. The Project infrastructure would be maintained for the duration of the operating period; at the end of its operational life, the Project infrastructure would be retired.

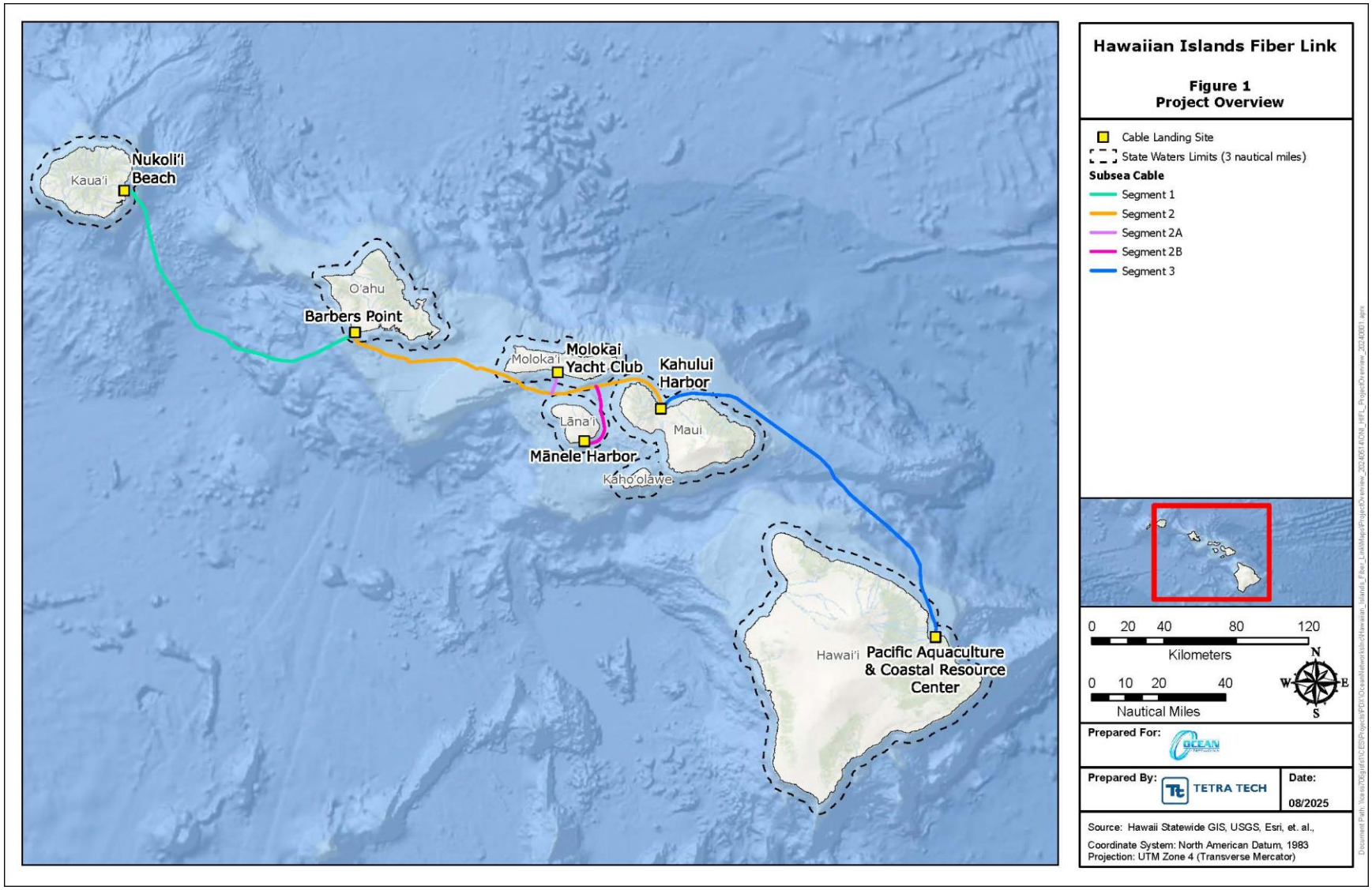


Figure 1. Overview map of the Hawaiian Island Fiber Link Project, showing the proposed subsea cable route and six cable landing sites (Map courtesy Tetra Tech).

1.3 CIA STUDY AREA, BACKGROUND, AND ENVIRONMENT

In keeping with the OEQC's Guidelines for Assessing Cultural Impacts, and in consideration of the Hawai'i Supreme Court rulings on the aforementioned court cases, the study area for this CIA includes the *ahupua'a* of each cable landing site. This CIA includes descriptions of the environment, traditional accounts, and post-Contact records concerning the activities conducted in each *ahupua'a*, with particular attention given to the vicinity of each specific portion of the HIFL project area.

1.3.1 Kaua'i Cable Landing Site

The proposed cable landfall on the island of Kaua'i is located at Nukoli'i Beach, an undeveloped beach park accessed via Kaua'i Beach Road from Kūhiō Highway, just north of Hanamā'ulu, in Hanamā'ulu Ahupua'a in the modern district of Līhu'e (Figure 2, Figure 3). The landfall would include a single HDD conduit, extending approximately 4,551 ft (1,387 m) from a BMH to the nearshore waters punchout point at a water depth of approximately 78 ft (24 m). The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be sited in an undeveloped portion of the beach park near the existing bathroom facilities. From the BMH, the terrestrial cable would be installed in new underground conduit along Kaua'i Beach Road and Kaua'i Beach Drive, terminating at a manhole at the intersection with Kūhiō Highway. From the BMH, the terrestrial cable would be installed in a combination of new underground conduit and third-party underground conduit along Kaua'i Beach Road and Kaua'i Beach Drive, terminating at a manhole near the intersection with Kūhiō Highway. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, generally following a route along Kūhiō Highway and Kaumuali'i Highway to Kaua'i Community College, in Niumalu Ahupua'a (Figure 4). The segments of fiber on the existing utility system are generally described herein to provide an overview of the entire system but are not analyzed as part of the proposed project because they comprise existing third-party infrastructure. Space within an existing building on the Kaua'i Community College campus would be used as the CLS for this cable landing. A new generator would be located adjacent to the existing building to provide emergency power; approximately 20 ft (6 m) of trenching would be required for underground conduit to run power between the generator and the CLS.

Līhu'e lies on the windward side of the island of Kaua'i. Līhu'e receives less rainfall than areas of Kaua'i located at higher elevation. Līhue receives a mean annual precipitation of 37.05 inches (94.107 cm). The mean monthly rainfall varies between 1.61 inches (4.09 cm) in June and 4.61 inches (11.71 cm) in March, with most rainfall occurring during the winter months. The annual high temperature in Līhu'e is 81˚F and the annual low is 70˚F (Longman et al. 2024).

The soils within the portion of the project area at Nukoli'i Beach consist of beach sand (BS) at the shoreline, as well as Mokuleia fine sandy loam (Mr) and fill land (Fd). The underground portions of the cable also traverse through poorly drained Mokuleia clay loam (Mta), Lihue silty clay (LhE2), and the Lihue gravelly silty clay series (LIC, LIB) (Figure 5).

Soils in the vicinity of the CLS at Kaua'i Community College fall largely within the Puhi silty clay loam series, characteristic of broad interfluves in the uplands of Kaua'i (Foote et al. 1972). Within this portion of the project area, soils consist of Puhi silty clay loam, 0 to 3 percent slopes (PnA).

These soils are well-drained and level, with moderately rapid permeability and slow runoff. They are typically used for agriculture, pasturage, and home sites (Foote et al. 1972:115) (Figure 6).

Vegetation within the project area at Nukoliʻi Beach includes maintained beach park vegetation, a coastal strand, and landscaped areas. There is an extensive manicured lawn of St. Augustine grass (*Stenotaphrum secundatum*) and Bermuda grass (*Cynodon dactylon*) mixed with weedy, non-native naturalized and planted ornamental species including beach wiregrass (*Dactyloctenium aegyptium*), nut grass (*Cyperus rotundus*), wedelia (*Sphagneticola trilobata*), red-flowered sida (*Sida ciliaris*), and wide-leaved carpetgrass (*Axonopus compressus*). The native *naupaka kahakai* (*Scaevola taccada* subsp. *taccada*) and Polynesian-introduced *niu* (coconut palm; *Cocos nucifera*) are planted near park facilities. Christmas berry (*Schinus terebinthifolia*) and the native *milo* (*Thespesia populnea*) occur near the shore. Scattered *ʻākulikuli* (*Sesuvium portulacastrum*), *alena* (*Boerhavia repens*), *kīpukai* (*Heliotropium curassavicum*), *pōhuehue* (*Ipomoea pes-caprae* subsp. *brasiliensis*) and *ʻaeʻae* (*Bacopa monnieri*) also occur. The coastal strand is dominated by patches of the native *naupaka kahakai* and native *ʻakiʻaki* (*Sporobolus virginicus*) grass, as well as scattered non-native tree heliotrope (*Heliotropium arboreum*). Other species include *maunaloa* (*Canavalia cathartica*), beach wiregrass, *alena*, and sourbush (*Pluchea carolinensis*). The landscaped vegetation along the edge of the roadways consists of maintained grass (Bermuda grass, St. Augustine grass, or wide-leaved carpetgrass) or ground cover and planted trees and shrubs including wedelia, *Pseuderanthemum carruthersii*, *Dracaena reflexa*, and oleander (*Nerium oleander*), coconut palms, areca palms (*Dypsis lutescens*), Chinese hibiscus (*Hibiscus rosa-sinensis*), and a hedge of *koa haole* (*Leucaena leucocephala* subsp. *leucocephala*). Large ficus trees (*Ficus* sp.) occur along Kauaʻi Beach Drive, and non-native ironwood (*Casuarina equisetifolia*) and the native *hau* (*Hibiscus tiliaceus*) overhang parts of Kauaʻi Beach Road. Various weedy species occur including Chinese violet (*Asystasia gangetica*), Carolina love grass (*Eragrostis pectinacea*), pitted beardgrass (*Bothriochloa pertusa*), coat buttons (*Tridax procumbens*), and creeping indigo (*Indigofera spicata*) (Tetra Tech 2025a).

The portion of the project area at Kauaʻi Community College includes landscaped areas with open, maintained lawns with native and ornamental species planted around building edges and walkways. Lawns have several grasses including St. Augustine grass, Hilo grass (*Paspalum conjugatum*), and wide-leaved carpetgrass. Low-growing weeds include love grass (*Eragrostis tenella*), nut sedge, hairy spurge (*Euphorbia hirta*), *Calyptocarpus vialis*, *Centella asiatica*, *Galinsoga parviflora*, narrow-leaved plantain (*Plantago lanceolata*), and creeping indigo. Several planted native species include *naupaka kahakai*, *milo*, *pōhinahina* (*Vitex rotundifolia*), *kokiʻo keʻo keʻo* (*Hibsicus waimeae* subsp. *waimeae*), *kou* (*Cordia subcordata*), and the endangered *loulu* palm (*Pritchardia napaliensis*). Ornamental planted non-native species include MacArthur palm (*Ptychosperma macarthurii*), fern tree (*Filicium decipiens*), *kukui* (*Aleurites moluccana*), Yeddo hawthorn (*Raphiolepis umbellata*), Chinese hibiscus, money tree (*Dracaena marginata*), snowbush (*Breynia disticha*), and *kī* (ti, *Cordyline fruticosa*) (Tetra Tech 2025a).

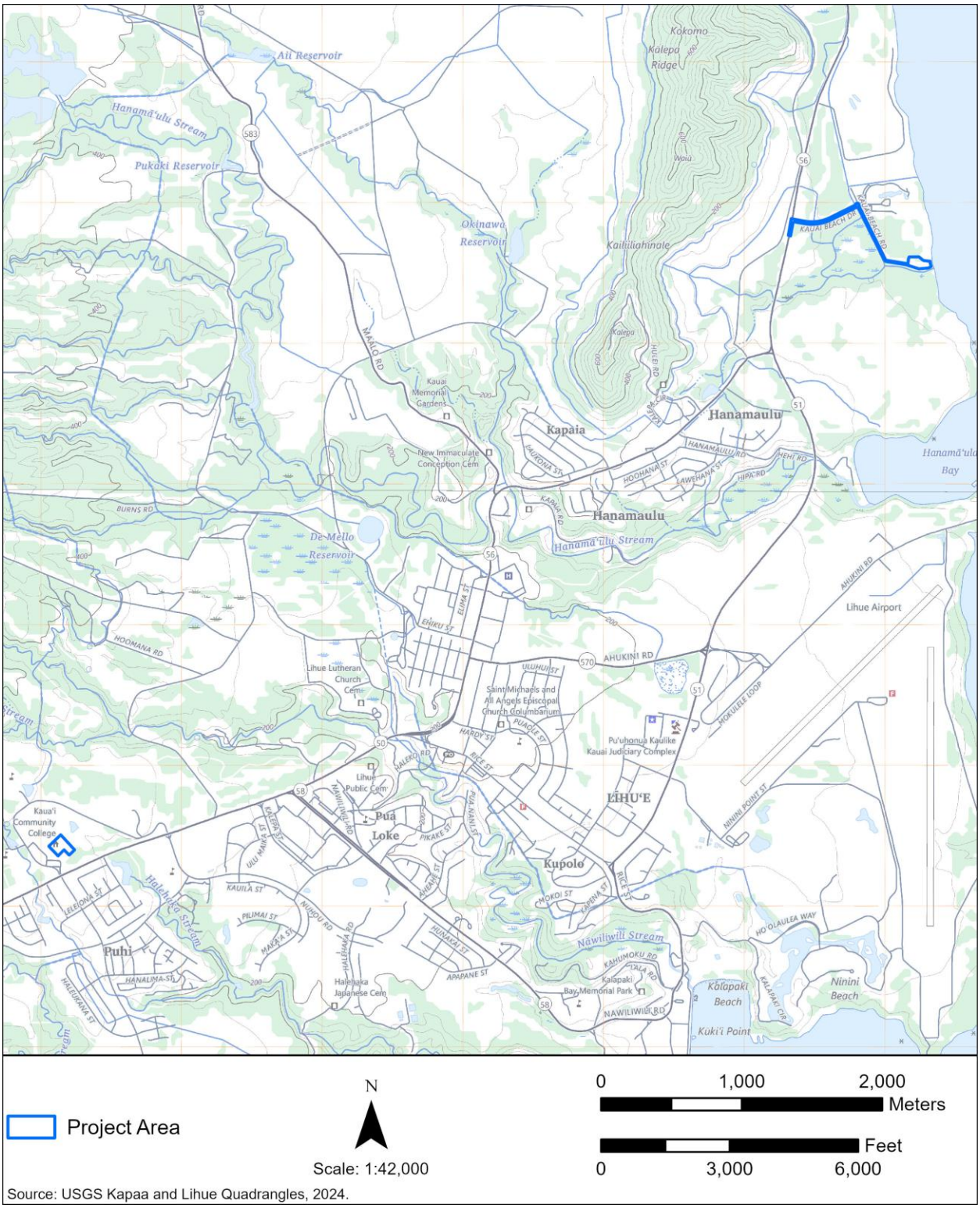


Figure 2. Location of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College on a USGS map.



Figure 3. Location of the Nukoli'i Beach portion of the HIFL project area with TMK boundaries.



Figure 4. Location of the Kauaʻi Community College portion of the HIFL project area with TMK boundaries.

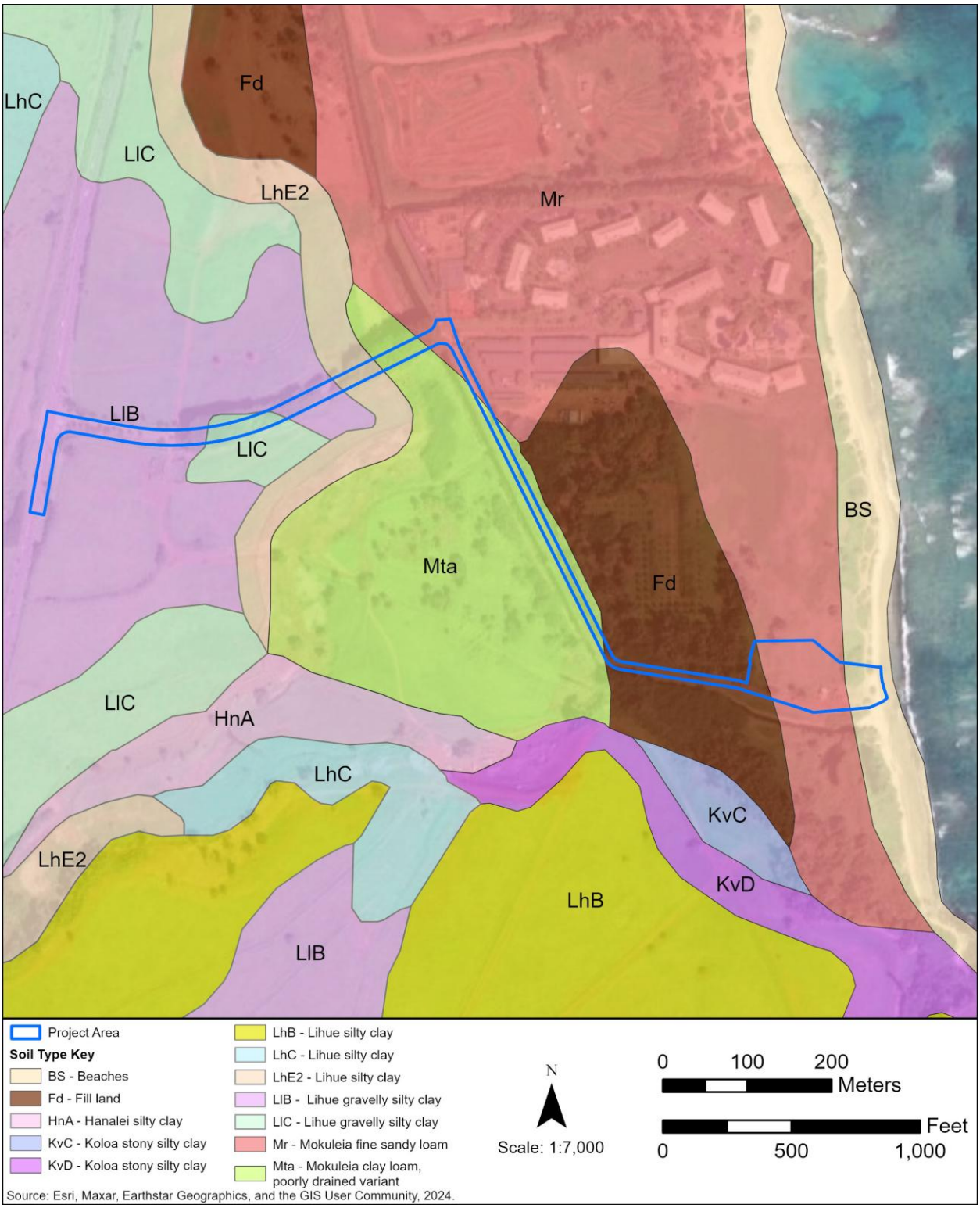


Figure 5. Soil types within and around the Nukoli'i Beach portion of the HIFL project area.

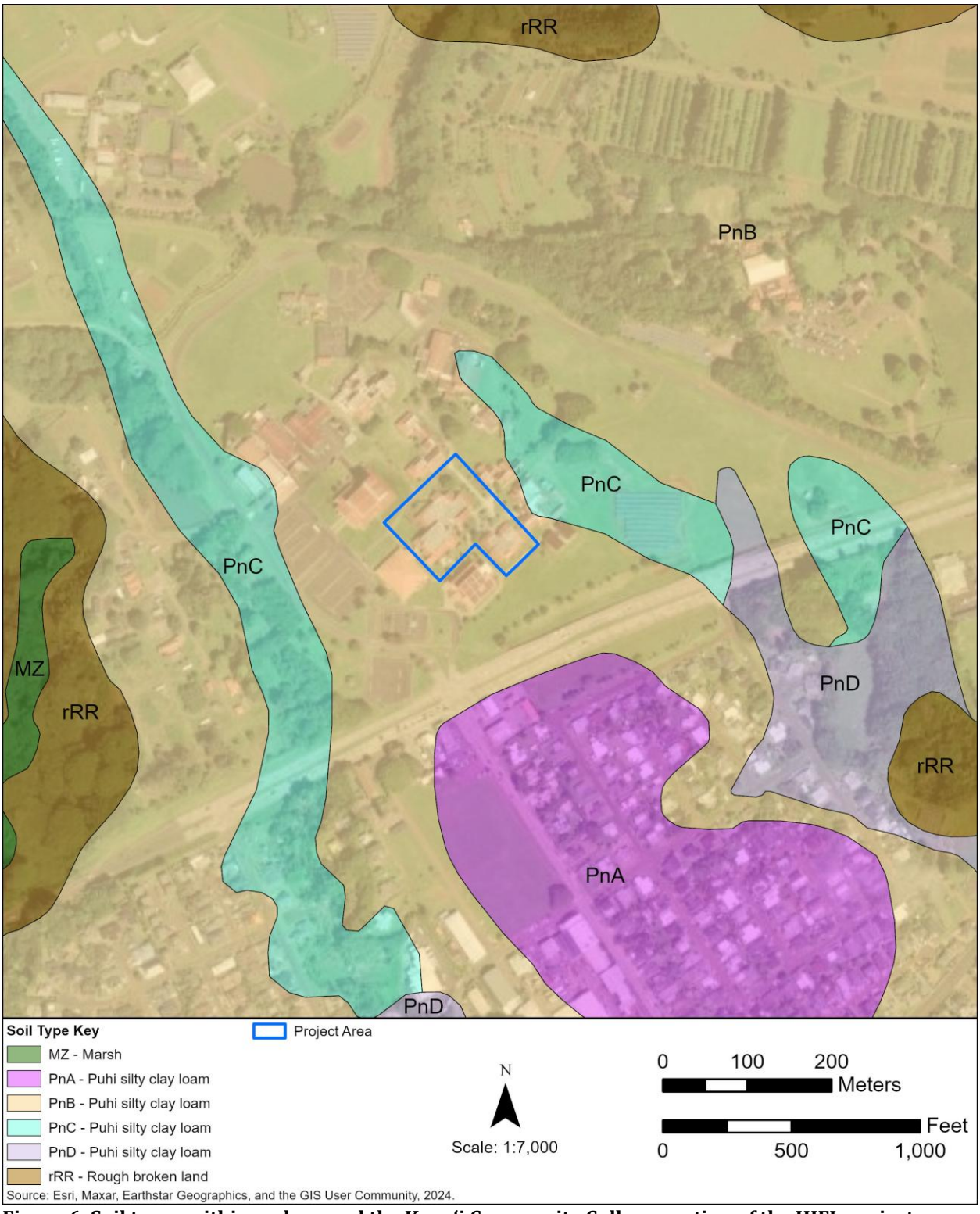


Figure 6. Soil types within and around the Kauaʻi Community College portion of the HIFL project area.

1.3.2 Oʻahu Cable Landing Site

The proposed cable landfall on Oʻahu is located at Barbers Point Beach Park in Kalaeloa on the south shore of Oʻahu, in Honouliuli Ahupuaʻa in the district of ʻEwa (Figure 7 and Figure 8). The landfall would require two HDD conduits: one extending approximately 4,400 ft (1,341 m) from a BMH to the nearshore waters punchout point for the cable connecting to Kauaʻi, and the other extending approximately 5,150 ft (1,570 m) from a BMH to the nearshore waters punchout point for the cable connecting to Maui. The punchout points would be at water depths of approximately 60 ft (18 m) and 65 ft (20 m), respectively. The BMHs and associated work areas would be located in an undeveloped portion of the beach park, near the existing bathroom facilities. At the BMHs, the subsea cables would each be spliced to a terrestrial cable, which would be installed in new underground conduit to a manhole located next to an existing utility pole at the end of Olai St. From this point, the project would utilize fiber owned by a licensed utility as part of the existing utility network, generally following a route along county and state roadways to the DR Fortress data center in central Honolulu. Space within an existing building at DR Fortress would be used as the CLS for this cable landing. En route, the fiber would also connect to the UH West Oʻahu campus, with space in an existing building used as a utility access point. No ground disturbance or new construction would be necessary at DR Fortress or UH West Oʻahu.

Barbers Point is located on the ʻEwa Plain on the leeward side of the island of Oʻahu. The leeward side is sheltered from trade winds by the Koʻolau Mountains, and has higher mean temperatures, with an annual high of 85˚F and an annual low of 69˚F. The rainfall in this area is low, with a mean annual precipitation of 16.68 inches (42.4 cm). The mean monthly rainfall varies between 0.35 inches (0.89 cm) in August and 2.52 inches (6.4 cm) in December, with most rainfall occurring during the winter months (Longman et al. 2024).

The project area soils at Barbers Point Beach Park consist of coral outcrop (CR) and beach sand (BS) (Figure 9). The coral outcrop is composed of Pleistocene limestone outcrop formed from coral reefs when sea levels were upwards of 7.5 m (24.6 ft) above current sea levels (Macdonald et al. 1983:420-421). Following a drop in sea level and uplifting of the island of Oʻahu, the exposed coral reef was eroded into a karst topography characterized by limestone pits and subsurface caverns (Ziegler 2002:96). The pits are typically “bell-shaped” in cross-section because of rainwater erosion that was more corrosive in the pit interiors due to a slower evaporation rate and mixing with ground water (Ziegler 2002:97).

Vegetation includes maintained beach park vegetation and a coastal strand. The maintained vegetation includes mowed grassy areas dominated by Bermuda grass and buffelgrass (*Cenchrus ciliaris*) mixed with non-native naturalized and planted ornamental species. Weedy species growing along the edges include pitted beardgrass, Guinea grass (*Megathyrsus maximus*), wiregrass, swollen fingergrass, khaki weed, Australian saltbush (*Atriplex semibaccata*), saltbush (*Atriplex suberecta*), *Euploca procumbens*, red-flowered sida, *Calyptocarpus vialis*, *Sesuvium verrucosum*, false mallow, obscure morning glory (*Ipomoea obscura*), beggartick (*Bidens alba* var. *radiata*), slender mimosa (*Desmanthus pernambucanus*), and Indian fleabane (*Pluchea indica*). Coconut palms, shower trees (*Cassia* sp.), and *kiawe* (*Neltuma pallida*) are among the planted species. Patches of the native *pāʻū o Hiʻiaka* (*Jacquemontia sandwicensis*) are present in the grassy areas and *kīpukai*, *ʻākulikuli*, *milo*, and *ʻuhaloa* (*Waltheria indica*) are scattered. A few *naio* (*Myoropum sandwicense* subsp. *sandwicense*) are present along the western boundary. The coastal strand includes native *naupaka kahakai* and *pōhuehue*, as well as scattered *Sesuvium verrucosum*, red-flowered sida (*Sida ciliaris*), and Indian fleabane, and natives *ʻakiʻaki*, *pāʻū o Hiʻiaka*, *kīpukai*, and *ʻākulikuli* (Tetra Tech 2025b).



Figure 7. Location of the Oʻahu portion of the HIFL project area at Barbers Point Beach Park on a USGS map.



Figure 8. Location of the Oʻahu portion of the HIFL project area with TMK boundaries.



Figure 9. Soil types within and around the Oʻahu portion of the HIFL project area.

1.3.3 Maui Cable Landing Site

The proposed cable landfall on the island of Maui is located at Kahului Harbor, on the north side of Central Maui, in Wailuku Ahupua‘a in the district of Wailuku (Figure 10, Figure 11). Specifically, the cable landfall would be on the western harbor breakwater, which is an undeveloped man-made feature that is part of HDOT’s harbor facility. This site would require two HDD conduits: one extending approximately 1,322 ft (403 m) from a BMH to the nearshore waters punchout point for the cable extending to O‘ahu, and the other extending approximately 3,337 ft (1,017 m) from the same BMH to the nearshore waters punchout point for the cable extending to Hawai‘i Island. These punchout points would be at water depths of approximately 30 ft (9 m) and 42 ft (13 m), respectively. The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be located within an undeveloped area on the western harbor breakwater. At the BMH, the subsea cables would each be spliced to a terrestrial cable, which would be installed in underground conduit extending across the western breakwater under Kahului Beach Road, to a manhole sited next to an existing utility pole adjacent to the highway. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, including the overhead system along state and county roadways as well as underground conduit extending into the UH Maui College campus. The CLS for this site would be a new modular structure in the area currently used for the recycling center on the northwestern edge of the UH Maui College campus. Underground conduit would be installed between the CLS and an adjacent building on the UH Maui College campus to connect the Project with the existing telecommunication and utility network.

Wailuku Ahupua‘a is located along the windward base of Mauna Kahalawai, which exposes it to the northeasterly trade winds. Rainfall is moderate in the vicinity of the project area: annual rainfall in the northern portion is 17.5 inches (44.6 cm), and 18 inches (45.6 cm) towards the southern end. The mean monthly rainfall varies between 5.9 mm in June and 88.3 mm in January, with most rainfall occurring during the winter months (Giambelluca et al. 2013).

Soils in the Maui portions of the HIFL project area consist of fill land (Fd) throughout the majority of the cable landfall area on the western harbor breakwater, and Puuone sand (PZUE) throughout the remainer of the portion of the project area on Maui (Figure 12). Fill land includes materials from dredging, excavations from adjacent uplands, and garbage and slurry from sugar mills (Foote et al. 1972:31). These materials are usually deposited and spread over marshes, coastal areas, coral sand, and areas with shallow bedrock. Fill lands have been historically used for sugarcane (Foote et al. 1972). Since the project area includes Kahului Harbor, it is likely that the fill also includes material derived from dredging of the harbor (McElroy et al. 2024:4). Puuone sand deposits are excessively drained soils derived from coral and seashells on the low uplands of Maui. Puuone sand is on sandhills (7 to 30 percent slopes) near the ocean with elevations ranging from 50 to 350 feet. These soils are used for pasture and home sites (Foote et al. 1972).

Vegetation within the cable landfall area includes coastal strand vegetation with ironwood, Indian fleabane, Australian saltbush, buffelgrass, silky jackbean (*Canvalia sericea*), and native *‘ākulikuli*, and ruderal vegetation with non-native, low stature grasses, shrubs, and herbaceous species, such as buffelgrass, Bermuda grass, rattlepod (*Crotalaria assamica*), creeping indigo, vining cow pea (*Macroptilium atropurpureum*), swollen fingergrass (*Chloris barbata*), red-flowered sida, *koa haole* (*Leucaena leucocephala* subsp. *Leucocephala*), and sparse *‘uhaloa* and *pā‘ū-o-Hi‘iaka*. The UH Maui College has landscaped lawns of Bermuda grass and buffelgrass and plantings including coconut trees, *pōhuehue*, *hau*, and *kou*. Native *‘uhaloa* has established naturally along disturbed edges. Native *naio* is planted adjacent to the Recycling and Redemption Center (Tetra Tech 2025c).



Figure 10. Location of the Maui portions of the HIFL project area at Kahului Harbor and UH Maui College on a USGS map.



Figure 11. Location of the Maui portions of the HIFL project area with TMK boundaries.

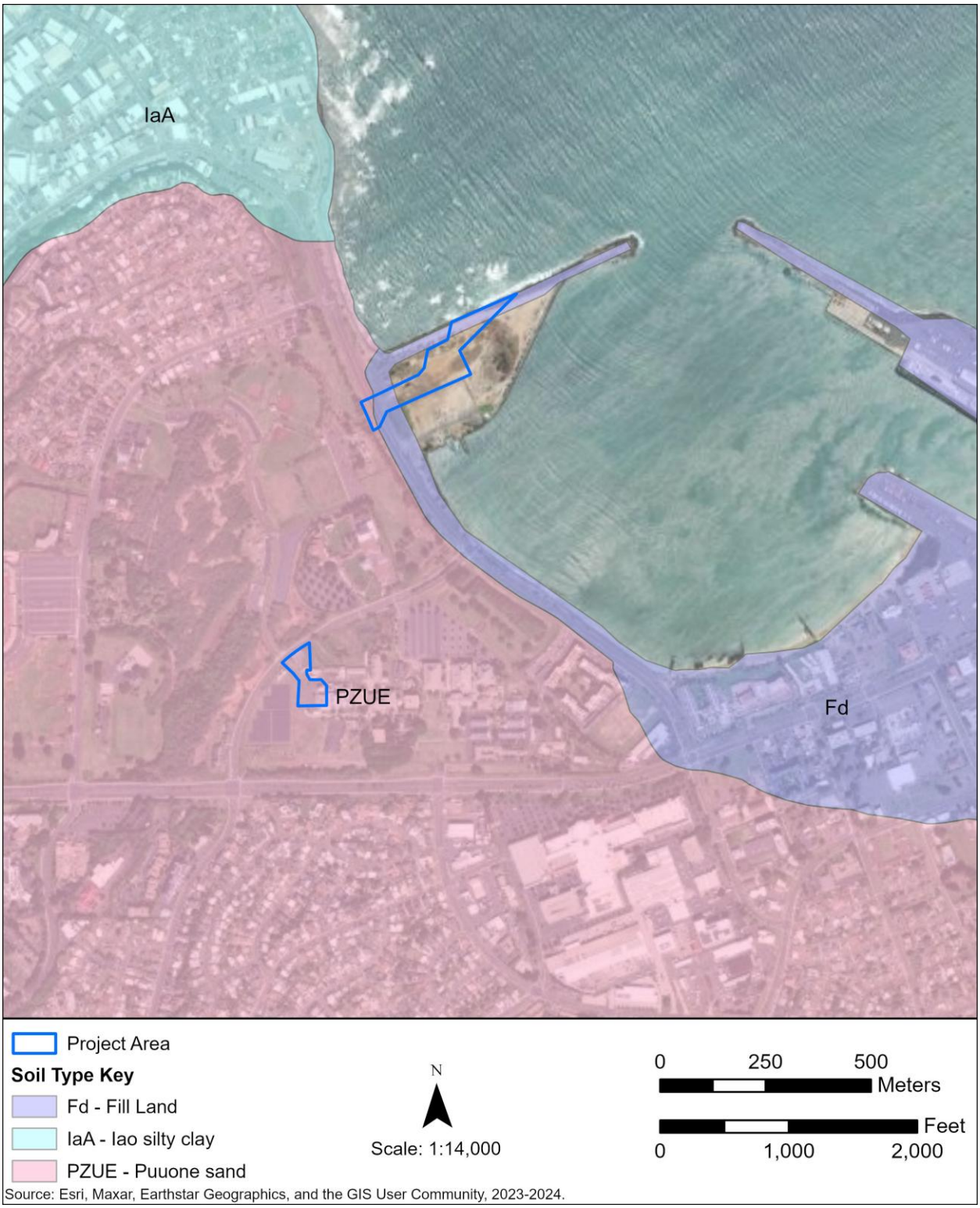


Figure 12. Soil types within and around the Maui portions of the HIFL project area.

1.3.4 Molokai Cable Landing Site

The proposed cable landfall on the island of Molokai is located north of Kaunakakai Harbor on the south side of Molokai, in Kaunakakai Ahupuaʻa within Kona Moku, within a parcel owned by the County of Maui and used by the Molokai Yacht Club (Figure 13, Figure 14). The landfall would include a single HDD conduit, extending approximately 877 ft (267 m) from a BMH to the nearshore waters punchout point at a water depth of approximately 3 ft (1.0 m); from the punchout point, the cable would be routed along the western edge of the dredged channel associated with Kaunakakai Harbor. The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be sited in an undeveloped area adjacent to the yacht club facilities. From the BMH, terrestrial cable would be installed in an underground conduit extending to a manhole sited next to an existing utility pole adjacent to Mauna Loa Highway. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, extending along Mauna Loa/Kamehameha V Highway to an existing utility pole located near the intersection of Kamehameha V Highway and Alanui Kaimike Street. New terrestrial cable would be installed in underground conduit to the CLS, which would be a new modular structure located on the property of the Molokai Education Center. Underground conduit would also extend into the Molokai Education Center to connect the Project with the existing telecommunication and utility network.

Kaunakakai Ahupuaʻa is located near the midpoint of the island on its south side, facing Lānaʻi. The terrestrial landscape is drier in this area than the eastern side of the island, receiving 11-12 inches of rainfall annually (Longman et al. 2024). A large natural channel extends out from the harbor area and through the fringing reef, providing passage between ocean and land as well as a safe area for anchorage.

Soils in the portion of the project area near the Molokai Yacht Club consist entirely of Kealia silt loam (KMW) (Figure 15). The Kealia series consists of poorly-drained soils found on the coastal flats of Molokai and Maui and has a brackish water table with tidal fluctuations (Foote et al. 1972:67).

A small portion of the project area near the Molokai Education Center also lies within Kealia silt loam soils. However, the majority of this area is within the Mala silty clay (MmA) series, which are well-drained soils that formed in recent alluvium and are used for truck crops, alfalfa, orchards, and wildlife habitat (Foote et al. 1972:92).

Vegetation within the Molokai Yacht Club portion of the project area includes a non-native pickleweed (*Batis maritima*) marsh along the shoreline, western boundary, and southwestern portion of the project area, along with ruderal vegetation with non-native grasses and low-growing herbaceous weeks and shrubs, including Bermuda grass, Australian saltbush, Indian fleabane, pickleweed, fingergrass, buffelgrass, and *Sesuvium verrucosum*, as well as scattered native *kīpūkai* (Tetra Tech 2025d).

At the Molokai Education Center, vegetation includes landscaped areas with open, maintained lawns and ornamental species planted near buildings. Lawns include wide-leaved carpetgrass and creeping indigo. Native *kou* trees and *naupaka kahakai* are planted around the buildings. Three Polynesian-introduced species, *kukui* trees, *kī*, and *kalo* (taro, *Colocasia esculenta*) are also planted in the area (Tetra Tech 2025d).



Figure 13. Location of the Molokai portions of the HIFL project area at the Molokai Yacht Club and Molokai Education Center on a USGS map.

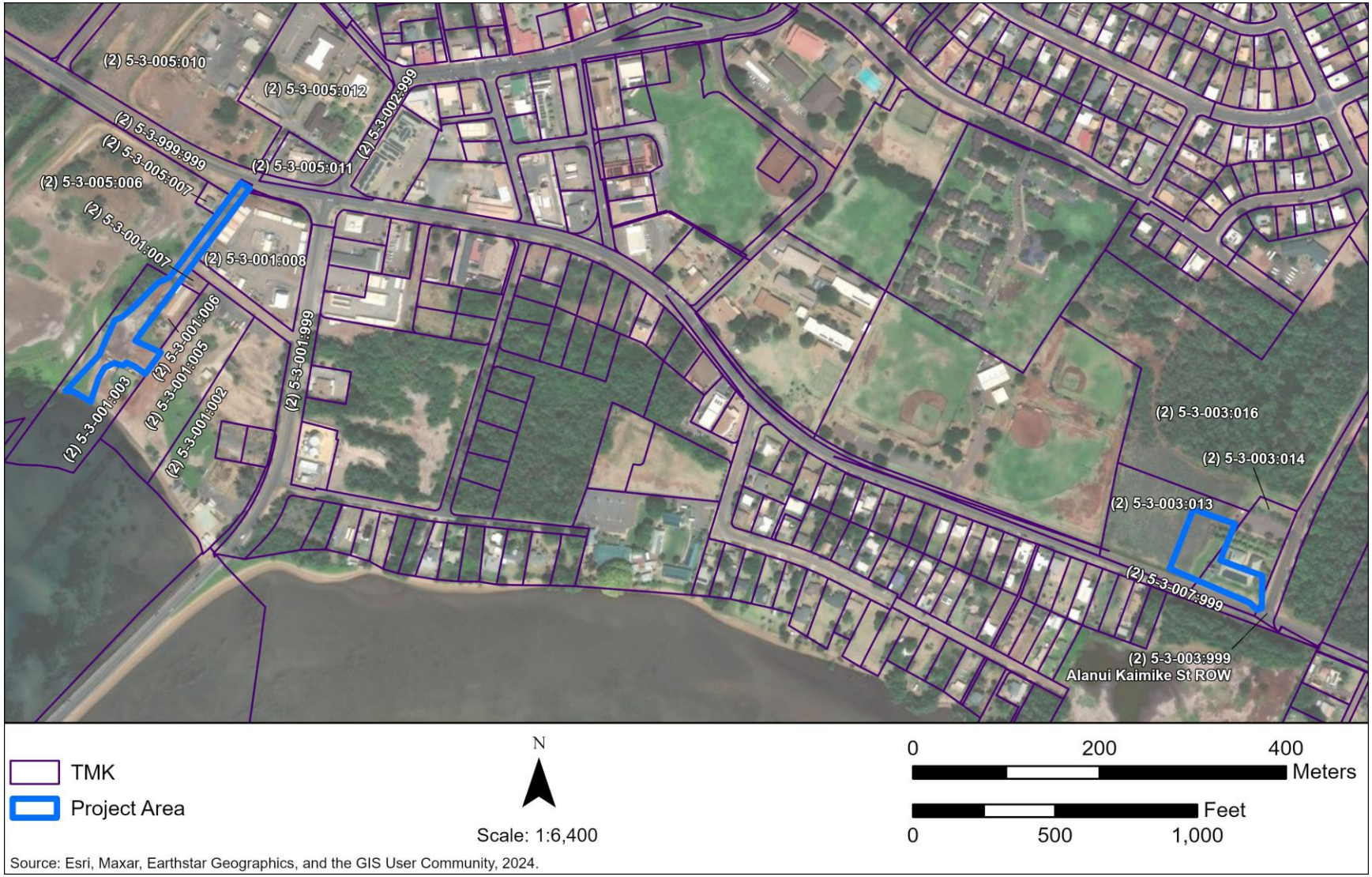


Figure 14. Location of the Molokai portions of the HIFL project area with TMK boundaries.



Figure 15. Soil types within and around the Molokai portions of the HIFL project area.

1.3.5 Lānaʻi Cable Landing Site

The proposed cable landfall on Lānaʻi is located at the Mānele Small Boat Harbor on the south side of the island, in Pālāwai Ahupuaʻa in the district of Lāhaina (Figure 16, Figure 17). The landfall would include a single HDD conduit, extending approximately 846 ft (258 m) from a BMH to the punchout point at a water depth of approximately 24 ft (7 m). The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be sited in the southern-most parking lot for the small boat harbor. From the BMH, the terrestrial cable would be installed in underground conduit to an existing manhole, where the Project would interconnect with the island's existing telecommunication network. From this point, the project would utilize fiber owned by a licensed utility as part of the existing telecommunication network, generally following a route along existing roadways to the UH Maui, Lānaʻi Education Center in Lānaʻi City. Space within an existing building at the Lānaʻi Education Center would be used as the CLS. No ground disturbance or construction will be required at the Lānaʻi Education Center.

The island of Lānaʻi sits within the rain shadow of the island of Maui, the much larger nearby high island within the archipelago. Mean annual rainfall in the vicinity of the project area is approximately 16.14 inches (41 cm) (Giambelluca et al. 2013).

The soils within the project area at Mānele Harbor primarily consist of Sandy Alluvial Land (rSL), which are found along the narrow coastal plains in the northern and northeastern regions of Lānaʻi. It is made up of recent stream deposits, featuring sandy soils with minimal pebbles or stones, and prone to flooding during rainy season (Foote et al. 1972:119,120). The remainder of this portion of the project area consists of Jaucas Sand (JaC) and Very Stony Land (rVs) (Figure 18).

Vegetation within this portion of the project area includes landscaped areas in the northern and central portions project area along the road edges and around the harbor infrastructure. Landscaping includes maintained lawns with wide-leaved carpetgrass and Hilo grass, and plantings of non-native ornamental plants bordering the lawns including Swiss-cheese plant (*Monstera deliciosa*), monkeypod (*Samanea saman*), and Manila palm (*Veitchia merrillii*). Weedy species have intruded into the landscaped areas and include swollen fingergrass (*Chloris barbata*), Carolina love grass, and Oriental hawksbeard (*Youngia japonica*). Few native species planted within this vegetation type include *kou*, *milo*, *pōhinahina*, and *pōhuehue*. Scattered native *ʻuhaloa* and hoary abutilon (*Abutilon incanum*) grow naturally along the disturbed edges of the landscaped vegetation. The kiawe/buffelgrass forest vegetation type occurs as a relatively narrow band along the southern margin of the project area. It includes moderately open to dense stands of *kiawe* trees with an understory of sparse to moderately dense patches of buffelgrass. Non-native weedy plants include golden crown-beard (*Verbesina encelioides*), spiny amaranth, obscure morning glory, bitter melon, and yellow wood sorrel (*Oxalis corniculata*). The native *ʻuhaloa* occurs rarely, and hoary abutilon is moderately common (Tetra Tech 2025e).

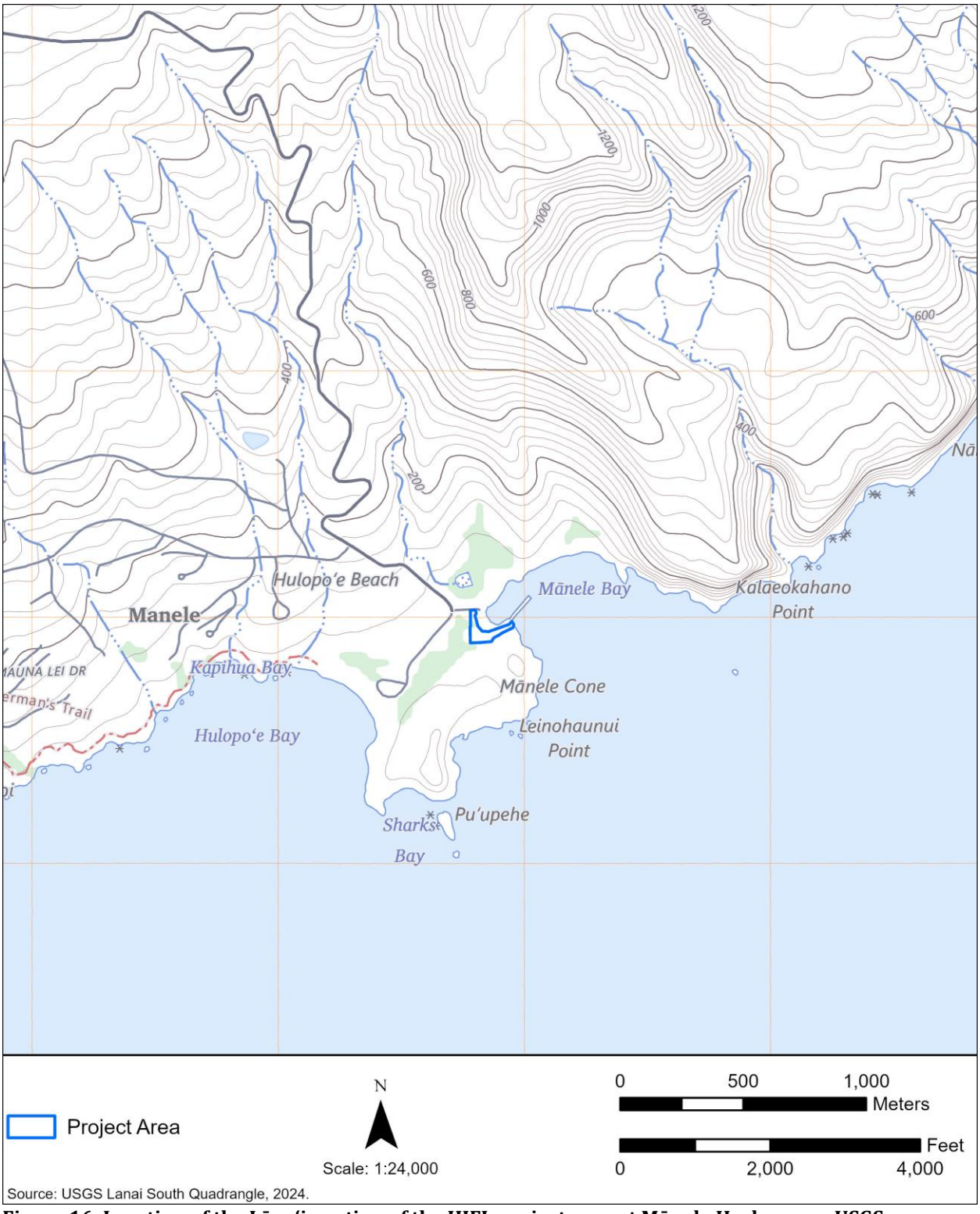


Figure 16. Location of the Lānaʻi portion of the HIFL project area at Mānele Harbor on a USGS map.



Figure 17. Location of the Lānaʻi portion of the HIFL project area with TMK boundaries.

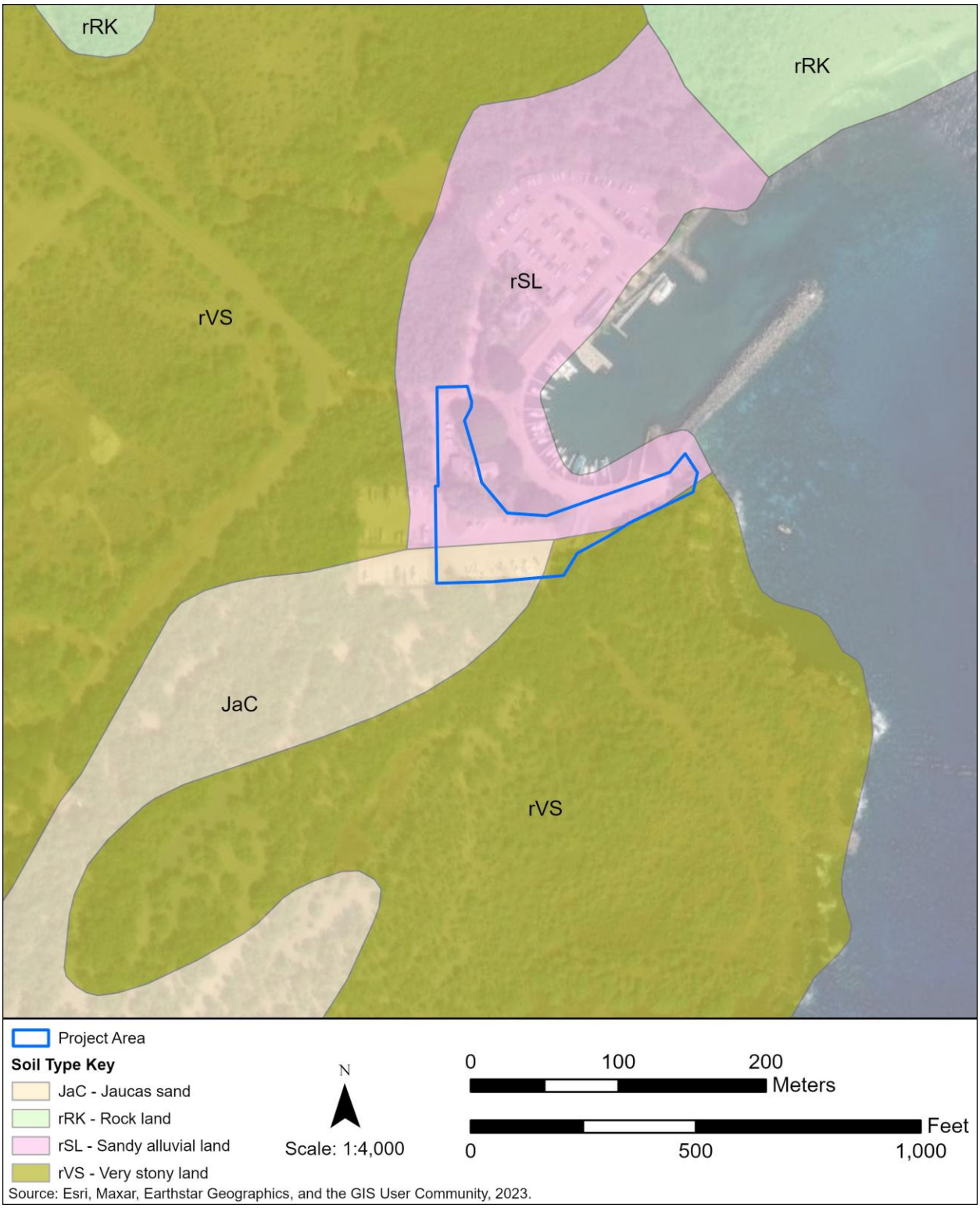


Figure 18. Soil types within and around the Lānaʻi portion of the HIFL project area.

1.3.6 Hawai‘i Island Cable Landing Site

The proposed cable landfall on Hawai‘i Island is located at PACRC, just east of the Hilo Harbor breakwater on the east side of the island, in Waiakea Ahupua‘a in the district of South Hilo (Figure 19, Figure 20). The landfall would include a single HDD conduit, extending approximately 1,185 ft (361 m) from a BMH to the nearshore waters punchout point at a water depth of approximately 61 ft (19 m). Given the presence of wastewater utility infrastructure in the immediate vicinity of the cable landfall, the HDD conduit would be specifically sited to facilitate crossing and avoid impacts to the buried wastewater pipes. The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be located in an undeveloped portion of the PACRC site. From the BMH, the terrestrial cable would be installed in underground conduit to a manhole installed adjacent to a nearby utility pole. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, including the overhead system along state and county roadways as well as underground conduit extending into the UH Hilo campus (Figure 21). The CLS for this site would be a new modular structure constructed on the northern side of the UH Hilo campus near Lanikāula Street. Underground conduit would be installed between the CLS and an adjacent building on the UH Hilo campus to connect the Project with the existing telecommunication and utility network.

Hilo is one of the wettest cities in the United States. Rainfall within the Hawai‘i Island portions of the HIFL project area average 130 inches (330.3 cm) per year, with rainfall remaining relatively consistent throughout the year and generally increasing dramatically in November (Giambelluca et al. 2013).

The Hawai‘i Island portions of the HIFL project area lie within three different soil types. The PACRC portion of the project area is within the Opihikao-Urban Land Complex (Figure 22), and the portion of the project area at the UH Hilo campus is within the Panaewa-Urban Land Complex and Keaukaha Highly Decomposed Plant Material (Figure 23).

Sato et al. (1973:43) describe the Opihikao-Urban Land Complex soil type as well-drained, thin organic soils over pahoehoe lava bedrock. The soil appears at sea level and into the uplands as high as 1,000 feet where rainfall ranges from 60 to 90 inches per year. Opihikao soils are extremely rocky muck (3 to 25 percent slopes) and are gently sloping and moderately steep soils. The muck is strongly acidic. Opihikao soils are associated with native forests or are used for pasture (Sato et al. 1973).

The Panaewa-Urban Land Complex is described by Sato et al. (1973:45) as shallow, moderately well drained silty clay loams. These soils form in volcanic ash. The soils are nearly level to gently sloping and are found on uplands at elevations ranging from 300 to 1,000 feet where rainfall ranges from 100 to 175 inches per year. The natural vegetation consists of ‘*ohi‘a* (*Metrosideros polymorpha*), tree fern, Hilo grass (*Paspalum conjugatum*), California grass (*Urochloa mutica*), and guava (*Psidium guajava*). The soils are used for sugar cane, pasture, and woodland. Permeability is rapid, runoff is slow, and the erosion hazard is slight (Sato et al. 1973:45-46).

The Keaukaha Soil Series is described by Sato et al. (1973:27) as well-drained, thin organic soils which overlay pahoehoe lava bedrock and occupy the low areas of Mauna Loa. These soils are found from near sea level to 1,000 feet in elevation where rainfall ranges from 90 to 150+ inches per year. The mean annual soil temperature is between 72° and 74°F (Sato et al. 1973:27). The natural vegetation consists of ‘*ohi‘a* (*Metrosideros polymorpha*), tree fern, uluhe fern (*Dicranopteris*

linearis), and guava (*Psidium guajava*). The soils are used for woodland, pasture, and home sites. The soil above the pahoehoe lava is rapidly permeable, and the pahoehoe is very slowly permeable, with water running rapidly through the cracks. The runoff is medium and the erosion hazard is slight (Sato et al. 1973:27).

Within the cable landfall portion of the project area at PACRC, the natural terrain has been impacted by mechanical alteration and bulldozing from previous projects and development (Haun and Henry 2000). PACRC contains maintained lawns dominated by Hilo grass, with ornamental plantings around buildings, roads, and fenceline edges and agricultural crops planted in discrete areas. Weedy species along the lawn edges include Guinea grass (*Megathyrsus maximus*), tick clover (*Grona triflora*), and *Spermacoce exilis*. Plantings of ornamental herbs, shrubs, and small trees include wedelia, fiddlewood (*Citharexylum caudatum*), and the Polynesian-introduced *kī*. Cultivated agricultural crops such as *kalo*, sugar cane (*Saccharum officinarum*), and cassava (*Manihot esculenta*) are growing in small, discrete areas in the southern portion of the project area. False kamani (*Terminalia catappa*) trees and coconut palms occur near the shoreline. The indigenous sedge *Cyperus polystachyos* occurs infrequently as well. A coastal strand including the native *naupaka kahakai*, as well as non-native coconut palms and false *kamani* trees is also present (Tetra Tech 2025f).

The vegetation at the UH Hilo campus is landscaped with maintained lawns and various planted ornamental shrubs and large trees. The lawns are dominated by wide-leaved carpetgrass and Hilo grass. Trees planted in the area include coconut palm, octopus tree (*Schefflera actinophylla*), African tulip (*Spathodea campanulata*), autograph tree (*Clusia rosea*), *Tabebuia heterophylla*, and paperbark (*Melaleuca quinquenervia*). Weedy plants growing within and on the edges of landscaping include silver fern (*Pityrogramma calomelanos*), artillery plant (*Pilea microphylla*), milkwort (*Polygala paniculata*), *maile honohono* (*Ageratum conyzoides*), oriental hawksbeard, *maile pilau* (*Paederia foetida*), and bearded begonia (*Begonia hirtella*). No native plant species were observed within the UH Hilo portion of the project area during the biological survey for this project (Tetra Tech 2025f).



Figure 19. Location of the Hawai'i Island portions of the HIFL project area at PACRC and UH Hilo on a USGS map.



Figure 20. Location of the PACRC portion of the HIFL project area with TMK boundaries.



Figure 21. Location of the UH Hilo portion of the HIFL project area with TMK boundaries.



Figure 22. Soil types within and around the PACRC portion of the HIFL project area.

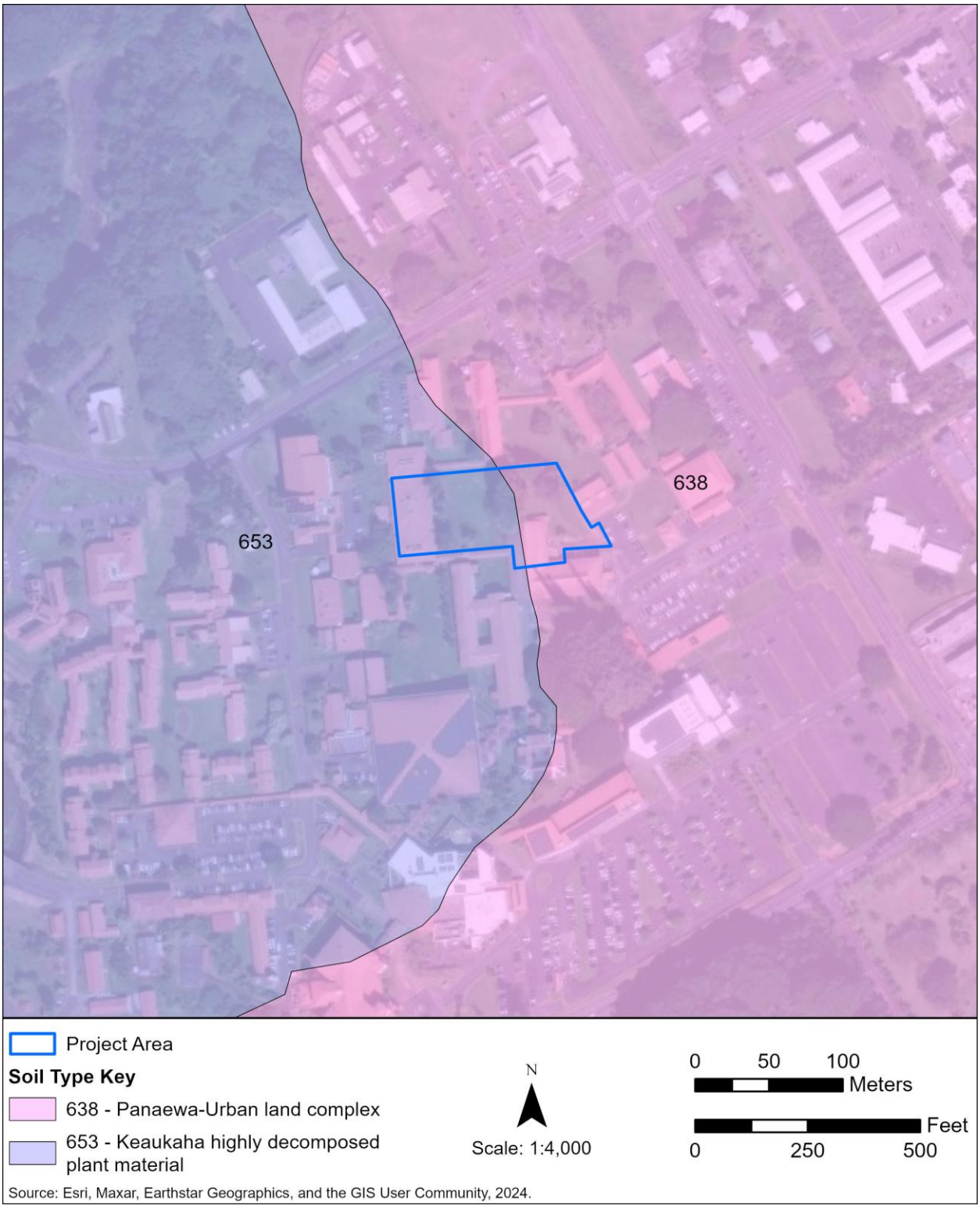


Figure 23. Soil types within and around the UH Hilo portion of the HIFL project area.

2.0 METHODS

The methodology used in the preparation of this CIA followed the Office of Environmental Quality Control's (OEQC's) Guidelines for Assessing Cultural Impacts (OEQC 1997).

2.1 ARCHIVAL AND BACKGROUND RESEARCH

To compile historic background information for this CIA and Ka Paʻakai Analysis, Pacific Legacy, Inc. consulted previous archaeological studies made available through the Hawaiʻi State Historic Preservation Division (SHPD) Office, relevant cultural impact studies from the OEQC online library, and relevant historical and ethnographic sources housed in the Pacific Legacy library and found through online databases including the Office of Hawaiian Affairs (OHA) Papakilo and Kīpuka Databases (https://www.papakilodatabase.com/ and https://kipukadatabase.com/), the Hawaiian Electronic Library, Ulukau (https://ulukau.org/index.php?l=en), the Hawaiian Legends Index at the University of Hawaiʻi at Mānoa (https://manoa.hawaii.edu/hawaiiancollection/legends/), and the Digital Archives of Hawaiʻi (https://digitalarchives.hawaii.gov/).

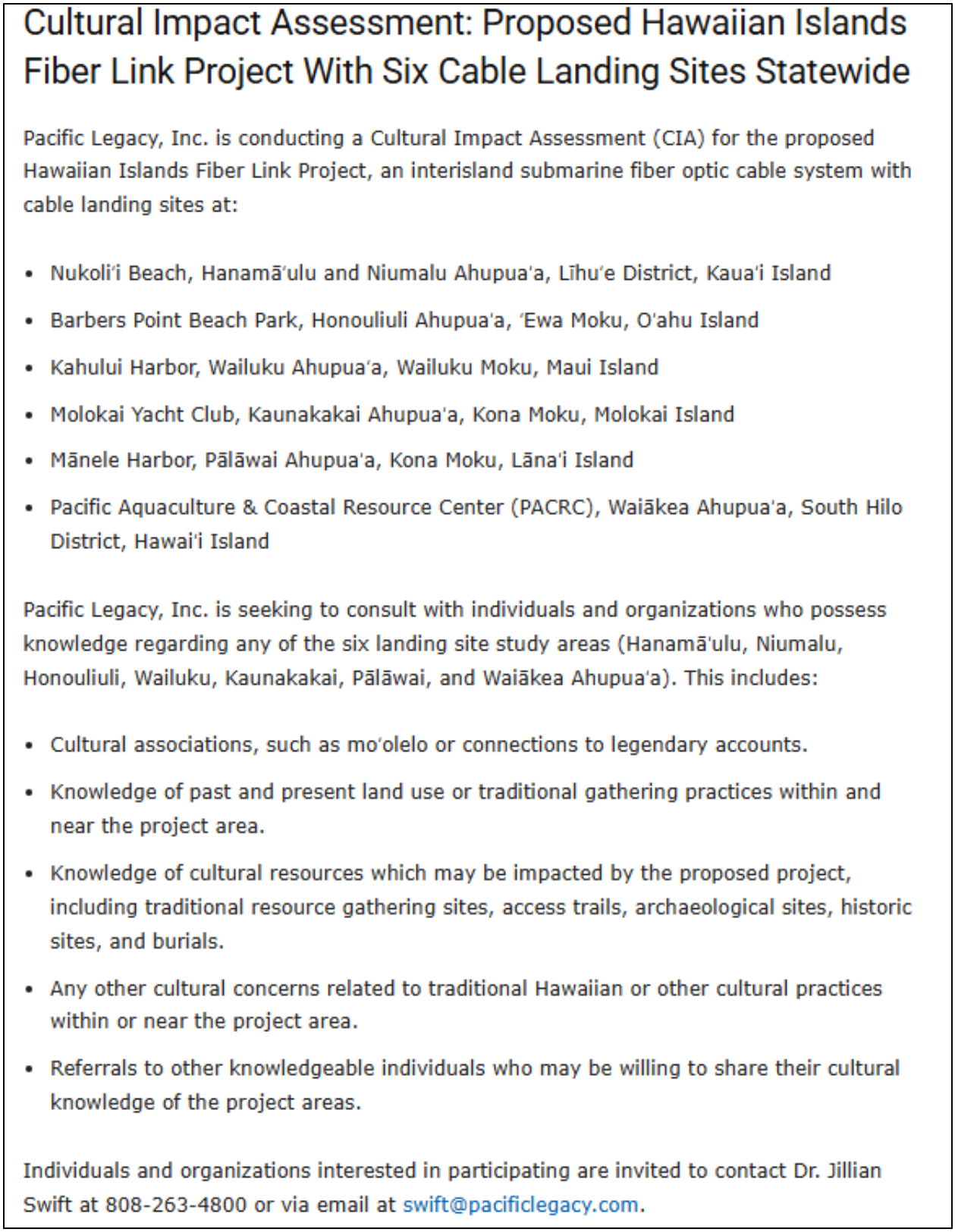
2.2 CONSULTATION

Initial letters soliciting participation in the CIA and Ka Paʻakai Analysis for the HIFL Project were sent via email to individuals, cultural groups, and government entities. Subsequent letters to additional potential CIA participants were emailed throughout the consultation phase as referrals were provided by some of the contacted agencies and individuals. A public notice was also posted to *Ka Wai Ola* for the month of May 2025. A total of 29 individuals provided feedback or referrals via email, or were interviewed either via phone or via Zoom, and 20 individuals attended a meeting and shared feedback in person. Appendix A includes lists of individuals who were contacted, their affiliations (where applicable), and participation, if any, in the current CIA and Ka Paʻakai Analysis. Individuals who requested to have their name or other identifying information withheld are not listed.

2.2.1 Scoping and Community Outreach

To initiate consultation for the CIA and Ka Paʻakai Analysis, contact was made with a range of government agencies, advisory councils, local community organizations, and individuals with generational ties to each *ahupuaʻa* within which portions of the HIFL project area are situated (see Appendix A). A notification of the project and invitation to participate was posted to the *Ka Wai Ola* monthly online public notices in May 2025 (Figure 24).

The text from the general letter and each of the site-specific letters that were distributed is included in Appendix A, along with a comprehensive list of all individuals, organizations, councils, and agencies who were contacted for this CIA and Ka Paʻakai Analysis. The first round of letters and project area maps were sent via email to individuals and organizations on March 31, 2025. Some of these parties provided referrals to additional individuals for consultation, who were subsequently contacted when possible with letters and project area maps. All letters requested that recipients respond with their interest in participating within two weeks of receiving the letter.



Cultural Impact Assessment: Proposed Hawaiian Islands Fiber Link Project With Six Cable Landing Sites Statewide

Pacific Legacy, Inc. is conducting a Cultural Impact Assessment (CIA) for the proposed Hawaiian Islands Fiber Link Project, an interisland submarine fiber optic cable system with cable landing sites at:

- Nukoliʻi Beach, Hanamāʻulu and Niumalu Ahupuaʻa, Līhuʻe District, Kauaʻi Island
- Barbers Point Beach Park, Honouliuli Ahupuaʻa, ʻEwa Moku, Oʻahu Island
- Kahului Harbor, Wailuku Ahupuaʻa, Wailuku Moku, Maui Island
- Molokai Yacht Club, Kaunakakai Ahupuaʻa, Kona Moku, Molokai Island
- Mānele Harbor, Pālāwai Ahupuaʻa, Kona Moku, Lānaʻi Island
- Pacific Aquaculture & Coastal Resource Center (PACRC), Waiākea Ahupuaʻa, South Hilo District, Hawaiʻi Island

Pacific Legacy, Inc. is seeking to consult with individuals and organizations who possess knowledge regarding any of the six landing site study areas (Hanamāʻulu, Niumalu, Honouliuli, Wailuku, Kaunakakai, Pālāwai, and Waiākea Ahupuaʻa). This includes:

- Cultural associations, such as moʻolelo or connections to legendary accounts.
- Knowledge of past and present land use or traditional gathering practices within and near the project area.
- Knowledge of cultural resources which may be impacted by the proposed project, including traditional resource gathering sites, access trails, archaeological sites, historic sites, and burials.
- Any other cultural concerns related to traditional Hawaiian or other cultural practices within or near the project area.
- Referrals to other knowledgeable individuals who may be willing to share their cultural knowledge of the project areas.

Individuals and organizations interested in participating are invited to contact Dr. Jillian Swift at 808-263-4800 or via email at swift@pacificlegacy.com.

Figure 24. Screenshot of the public notice posted to *Ka Wai Ola* in May 2025.

3.0 ARCHIVAL AND BACKGROUND RESEARCH

3.1 KAUAʻI CABLE LANDING SITE

The Kauaʻi portions of the HIFL project area span two *ahupuaʻa* (traditional land division) within the traditional *moku* (district) of Puna, now part of the modern tax district of Līhuʻe (*lit.* "cold chill," (Pukui et al. 1974:132). The cable landfall is at Nukoliʻi Beach Park in Hanamāʻulu Ahupuaʻa. From the cable landfall, the Project will utilize fiber optic cables on the existing utility network to connect with the CLS at Kauaʻi Community College, which is within the traditional boundaries of Niumalu, Nāwiliwili, and Haʻikū Ahupuaʻa. However, the Kauaʻi Community College portion of the HIFL project area is entirely within the *mauka* boundaries of Niumalu Ahupuaʻa.

Hanamāʻulu is defined literally as "tired (as from walking) bay," and is the name not only for the *ahupuaʻa*, but also for a landing, village, bay, ditch, river, and beach park within Līhuʻe (Pukui et al. 1974:41). The name is said to reflect the tiresome journey of travelers who had to walk extra miles to reach this area (Wichman 1998:60-61). Pukui et al. (1974:41) also identify Hanamāʻulu as the birthplace of Kawelo.

Niumalu translates literally to "shade [of] coconut trees" (Pukui et al. 1974:166). According to *moʻolelo*, the name originated from the legendary spear and stone throwing contest between Kapūnohu and a local Kauaʻi man named Kemamo. During the contest, Kapūnohu threw his spear towards Kalalea, casting a shadow over the coconut trees, thus the (Wichman 1998:57, Fornander 1918:224).

As described by Rice (1914), the modern tax district of Līhuʻe was established in 1861 from the earlier Puna Moku, then further subdivided into Līhuʻe and Kawaihau in 1880:

> The name, Lihue, applied in a larger sense, included the districts of what are now Kawaihau and Lihue, reaching from Anahola to the Gap, being made so by law in about the year 1861, according to early court records, but some years later divided into the present two districts. The large district was also known as the Puna district and is found on early maps as such. It was August thirteenth, 1880, that the district was divided into two, by act of Legislature with King Kalakaua's signature. (Rice 1914, reprinted in Kauai Historical Society 1991:46)

Puna Moku is dominated by the Wailua River watershed (*lit.* "two streams," (Pukui et al. 1974:224), which flows from the mountains, dividing into two large streams, the North and South Forks of the Wailua River. The Wailua River is the longest navigable stream in the Hawaiian Islands. Puna grew to be a kingdom in the pre-Contact era, established by Puna-nui-ka-ia-ʻāina, who led settlers from the Marquesas between 1000 and 1100 A.D., and established a chiefdom independent of Kona. By the end of the fourteenth century, the Puna kingdom had spread into the area between the Hāʻupu Range and the Makaleha Mountains, with seven *ahupuaʻa* to the south of the river, and five to the north (Wichman 1998:50).

3.1.1 Significant Place Names

Traditional Hawaiian place names given to significant places carry meaning and can convey much about the history of a place, its physical characteristics, the qualities of the people who resided

there, and other culturally significant information. In the preface to *Place Names of Hawaii* (Pukui et al. 1974), Samuel Elbert writes:

Hawaiians named taro patches, rocks and trees that represented deities and ancestors, sites of houses and *heiau* (places of worship), canoe landings, fishing stations in the sea, resting places in the forests, and the tiniest spots where miraculous or interesting events are believed to have taken place. (Pukui et al. 1974:x)

A selection of place names associated with Hanamāʻulu and Niumalu Ahupuaʻa are listed in Table 1 and Table 2, and depicted in Figure 25 and Figure 26, respectively. All place names listed have been identified through Boundary Commission Testimonies, historic maps, and information received from CIA participants. Literal translations of place names have been added when they could be found in Pukui et al. (1974) or Pukui and Elbert (1986).

Table 1. Place Names Associated with Hanamāʻulu Ahupuaʻa

Place Name	Description/Significance	Source
Ahukini	Village or place (USGS 1963); coastal land section and landing north of Nāwiliwili, named for the son of Laʻa-mai-Kahiki, who came from Tahiti; *lit.* "altar [for] many [blessings]" (Pukui et al. 1974:6); also defined as "shrine for many blessings" (Wichman 1998:61). According to Wichman, "Chief Ahukini lives circa 1250 A.D. and was one of the three sons of Laʻa-mai-kahiki, who had come from Raiʻātea in the Society Islands to visit with his foster father Moʻikeha. Ahukini became *aliʻi nui* of Puna after Ka-ʻili-lau-o-ke-koa, granddaughter of Moʻikeha, died without children of her own. On the bluff was a *heiau* of the same name. It was a medium-sized temple, but by the turn of the century only the foundations remained" (Wichman 1998:61).	USGS 1963a, USGS 1963b
Hanamāʻulu	Landing, land section, *ahupuaʻa*, village, bay, ditch, river, beach park, *ʻili ʻaina* (inherited land); *lit.* "tired (as from walking) bay" (Pukui et al. 1974:41); birthplace of the hero Kawelo (Pukui et al. 1974:41).	USGS 1963a, USGS 1963b, USGS 1965
Hāʻupu	Peak, ridge, *loʻi; lit.* "recollection," probably named for a demigod; also called Hoary Head (Pukui et al. 1974:42-43). "When rain clouds shrouded its top, the old seers saw the shapes and presence in the cloud forms of Kamapuaʻa, and were able to predict rain" (Handy and Handy 1972:427). Hāʻupu is associated with hogs and *ʻuala*, and there are number of *hula* and chants recorded about the association of hogs and weather, particularly rain, that reference this area (Handy and Handy 1972:144-145). The *moʻolelo* of Hāʻupu tells of a giant named Hāʻupu, "who was very large and very nervous, reacting violently to every sound. He did so much damage unwittingly and was so contrite afterwards he became even more nervous. So his *aliʻi nui* sent him to the mountain to keep watch over the ocean and to warn if any invading fleet of canoes was on the way. Hāʻupu never slept very much for fear he would miss a canoe fleet. One night he was awakened from a doze by the sounds of shouting. Looking toward Oʻahu, Hāʻupu saw lights flickering on the horizon. Convinced an invasion was coming, Hāʻupu threw some huge stones he had gathered toward the invaders. The lights went out, the voices died away, and Hāʻupu went back to sleep. A few days later, a messenger reported that Oʻahu was in great sorrow. The chief of Waiʻanae had gathered his people together at Kaʻena point for a great fishing festival. They had taken their canoes out to lay nets by torchlight…Suddenly huge stones had fallen from the sky, one smashing the fleet of canoes…Many people had been killed, including the chief. One of the rocks is still there and is called Pōhaku-o-Kauaʻi, 'rock of Kauaʻi'" (Wichman 1998:55-56).	Ulukau 2002-2019
Kaʻiliʻiliahinale	Boundary point, ridge, peak; also known as Kaʻiliʻiliahi; *lit.* "pebblestone of the clear fire," a reference to the stones used in playing *kōnane* (Hawaiian checker game). This may have been a good place to find small pebbles that could be used for the game pieces (Wichman 1998:62-63, Soltz et al. 2014:15).	USGS 1963a, USGS 1963b
Kalalea	*Puʻu*; *lit.* "prominent" (Pukui et al. 1974:73-74); described as being "inland of Anahola, Ka-wai-hau…which has a conspicuous hole near the top said to have been pecked open by Hulu, a supernatural bird, who wanted to see Anahola on the other side. Hulu could also change himself into man and *moʻo*" (Pukui et al. 1974:73-74). Another version of the story, perhaps told later, is that the hero Kawelo threw his spear through this hole, and yet another version attributes Kapūnohu as the one who cast the spear (Pukui et al. 1974:73-74).	USGS 1965

Place Name	Description/Significance	Source
Kalauokamanu	*Heiau; Poʻokanaka* class; also known as Kalauokamani; destroyed in 1855 and the stones were used to build the Hanamāʻulu Sugar Mill (Wichman 1998:61-62; Bennett 1931:125; Soltz et al. 2014:16; Lahainaluna Students 1885 in Bishop Museum, Archives Hawaiian Ethnological Notes I:218 in Soltz et al. 2014:16); defined as "tip of the endpiece of the canoe" (Wichman 1998:61).	On File, HICRIS
Kālepa	Mountain, ridge, forest reserve, trail; *lit.* "trade" (Pukui et al. 1974:76); also defined as "to flutter" (Wichman 1998:61, Soltz et al. 2014:15), "to wave," or "marker flag or ensign," (Wichman 1998:61) referring to the practice of waving a flag from the ridge when one had something to trade, which led to the word also being used for a peddler or tradesman. Wichman argues that the older meanings of "to flutter," "to wave" or "marker flag or ensign," gave rise to the newer meaning of "to trade, to sell, to peddle," or as a noun, "trader, peddler, salesman." If someone had items for barter, they would raise a flag to indicate that *poi* or another item was for sale or trade (Wichman 1998:61).	USGS 1963a, USGS 1963b
Kapaia	Village, stream, reservoir, *ʻili ʻaina*; *lit.* "the walls *or* bowers" (Pukui et al. 1974:87)	USGS 1963a, USGS 1963b; Ulukau 2002-2019

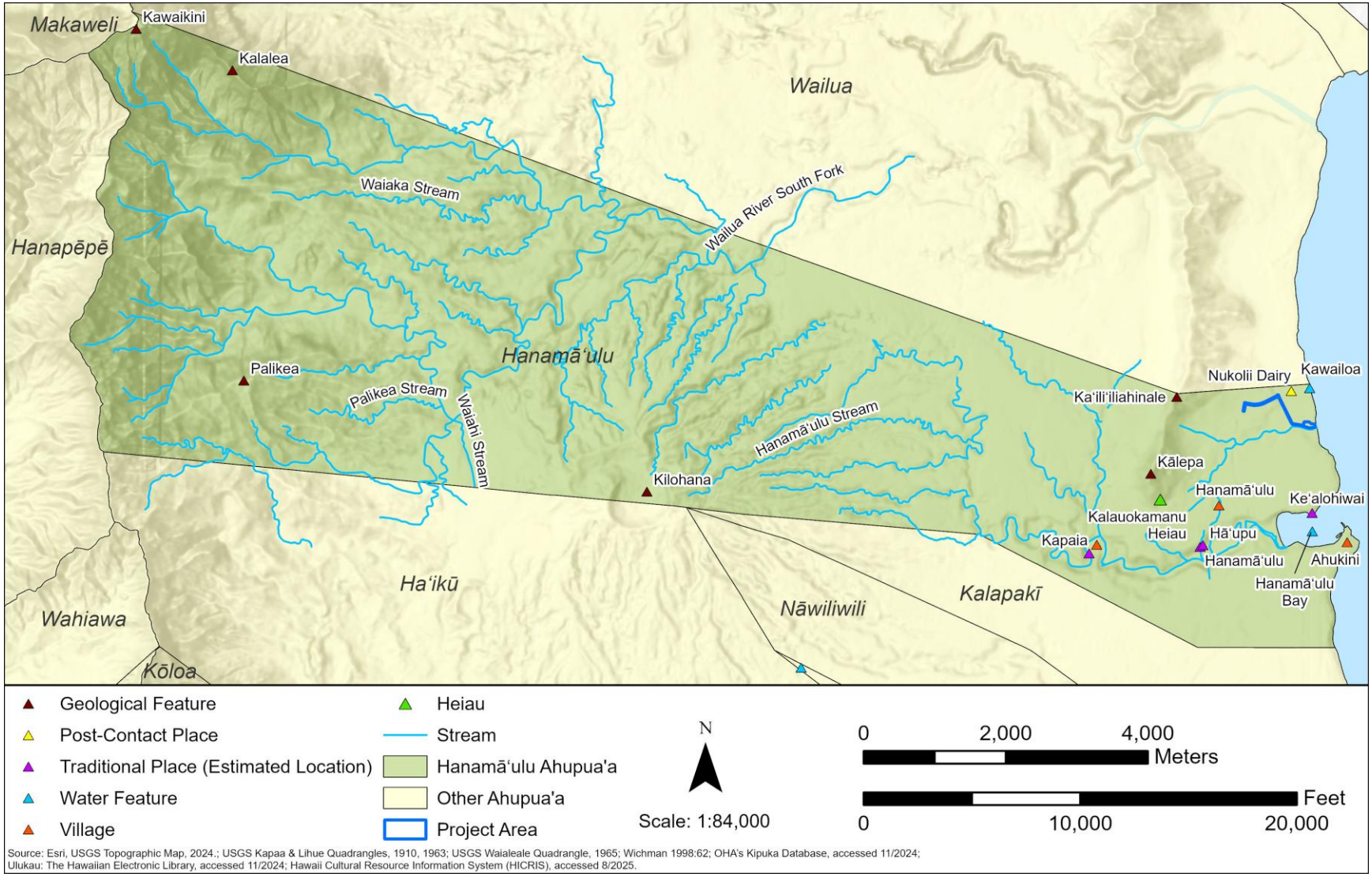


Figure 25. Significant place names in Hanamā'ulu Ahupua'a.

Table 2. Place Names Associated with Niumalu Ahupuaʻa

Place Name	Description	Source
Alakoko Fishpond	*loko iʻa*; also known as ʻAlekoko, Alekoko, Menehune, Pepeʻawa; name signifies "bloody wave, because the sea food growing in the pond gave the ripples of the water a reddish cast when the sun was shining" (Honolulu Star-Bulletin 1936:45). Another *moʻolelo* defines the name as "rippling blood," in reference to the bloody hands of the *menehune* workers, who were injured by the rocks, which were not water polished and smooth when they built the fishpond (Wichman 1998:57-58).	Ulukau 2002-2019
Hulēʻia River	See Hulā-ʻia (Pukui et al. 1974:53), described as the old name for Hulēʻia Stream; *lit.* "pushed through (Kama-puaʻa ravished Pele here)" (Pukui et al. 1974:53). Some also attribute this *moʻolelo* of Pele and Kamapuaʻa to Haʻikū (Wichman 1998:51).	USGS 1963b
Kalanipuʻu	*puʻu, wahi pana*; *lit.* "the royal hill" (Pukui et al. 1974:75) or "heavenly hill" (Wichman 1998:51); formerly a calling hill (*puʻu kāhea*) from which the movements of fish were called out, Pele's older sister, Nā-maka-o-Kahaʻi, planted *ʻawa* and bananas here (Pukui et al. 1974:75, Wichman 1998:51).	USGS 1963b
Nāwiliwili	Village, land division, *ahupuaʻa,* port, stream, and bay; *lit.* "the *wiliwili* trees" (Pukui et al. 1974:164). *Wiliwili (Erythrina sandwicensis)* trees are a member of the legume family and have bright red seeds which are used to make *lei* (Wichman 1998:58-59).	USGS 1963b
Niumalu	Village; beach park, land division, flats (geological place); *lit.* "shade [of] coconut trees" (Pukui et al. 1974:166).	USGS 1963b
Pūʻali	*ʻili ʻaina,* stream; defined as "warrior, soldier, so called because Hawaiian fighters tied (*pūʻali*) their *malos* at the waist so that no flap would dangle for a foe to seize; army, host, multitude…to gird tightly about the waist, as of *malo*-clad warriors, or as corseted women; compressed, constricted in the middle; grooved, notched; irregularly shaped, as taro; notch; tight belt" (Pukui and Elbert 1986:346).	USGS 1963b; Ulukau 2002-2019; Office of Hawaiian Affairs 2025
Puhi Stream	Stream; crosses into Haʻikū Ahupuaʻa to the south and runs through Puhi Camp (See Section 0); lit. "blow" (Pukui et al. 1974:192); "a shark god, Ka-holi-a-Kāne (the sprouting [made] by Kāne) lived in a cave here" (Pukui et al. 1974:192). Ka-holi-o-Kāne was "a shark god of Ka-lani-ʻōpuʻu, a chief under Kamehameha I who ordered the wholesale killing of Kauaʻi aliʻi after their ill-fated rebellion in 1824. With Kua, the shark god of Kohala, Ka-holi-o-Kāne raised a storm between Kauaʻi and Oʻahu to destroy Hiʻiaka in order to prevent the marriage of their relative Pele with Lohiʻau. Hiʻiaka overcame the storm, found Lohiʻau, and returned to Hawaiʻi" (Wichman 1998:59).	USGS 1963b

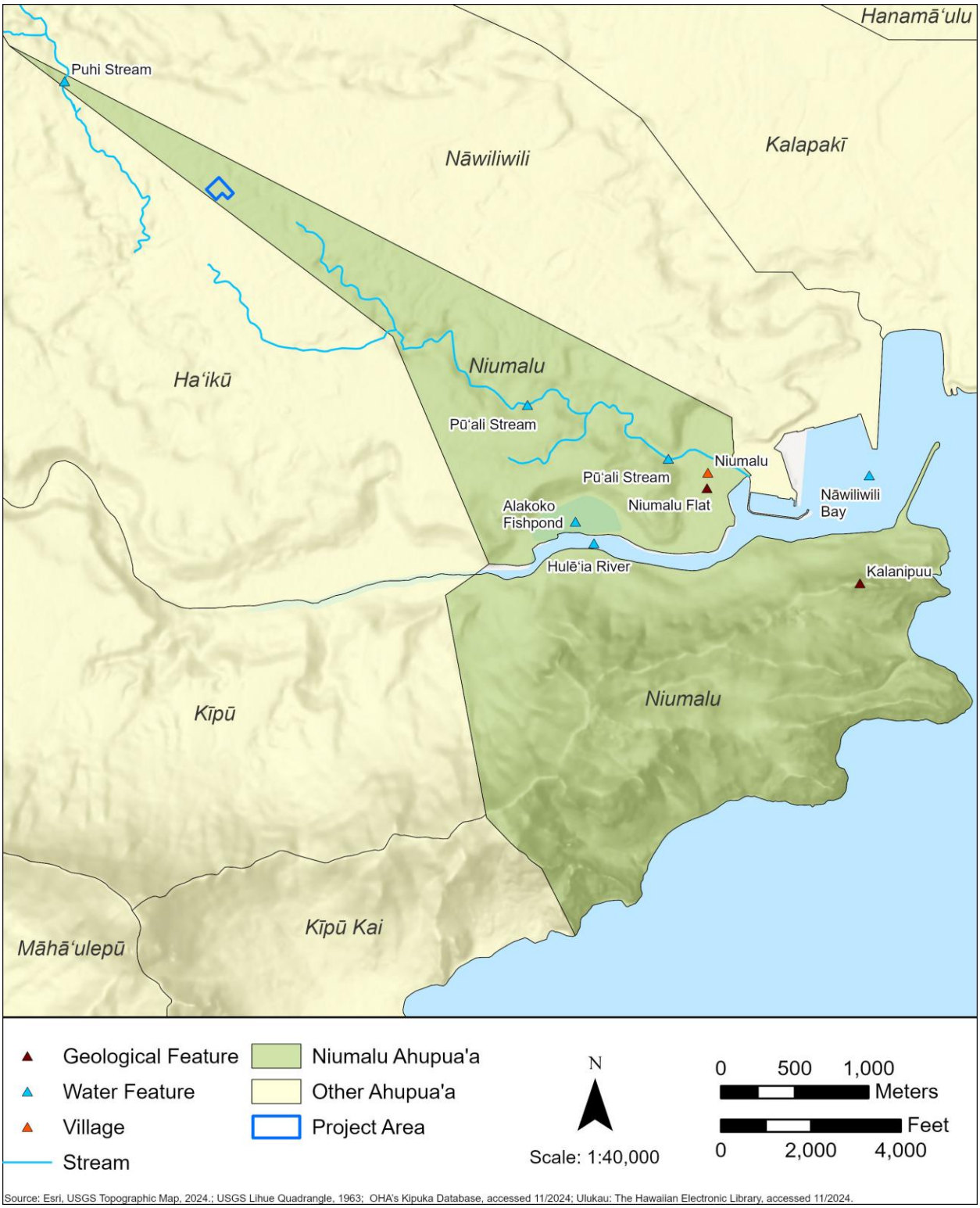


Figure 26. Significant place names in Niumalu Ahupuaʻa.

3.1.2 Moʻolelo

Hawaiian legends, stories, myths, proverbs, and songs, were passed down by word-of-mouth for generations prior to the arrival of Westerners to the archipelago. The introduction of the written word saw many of these traditions, which include *moʻolelo* (story, tradition, record), *kaʻao* (legend, usually fiction), *mele* (song, chant), and *ʻōlelo noʻeau* (proverb, saying), recorded in ʻŌlelo Hawaiʻi (the Hawaiian language). A relatively small number of these oral traditions have been translated to English and shared publicly over the years. A selection of those made available in English are presented here. Though this likely represents only a sliver of the rich oral historical record connected to this region, they provide insight into past resources, land use, beliefs, and cultural practices.

Hanamāʻulu

Many of the oral historical accounts of Hanamāʻulu refer to the canoe landings in the area, which were easier in the protected bays; describe the lack of resources and sustenance; and speak to the powerful winds of Kauaʻi Island. The *moʻolelo* provide context for place names and their significance, and also speak to important events. The *moʻolelo* and the presence of a major *heiau* of the *poʻokanaka* class also suggest the likelihood of Hanamāʻulu as the residence of some *aliʻi*.

Hiʻiakaikapoliopele

Nogelmeier (2006) published a landmark two-volume set including an English translation of *Ka Moʻolelo o Hiʻiakaikapoliopele* (*The Epic Tale of Hiʻiakaikapoliopele: Woman of the Sunrise, Lighting-Skirted Beauty of Halemaʻumaʻu*), originally written by Hoʻoulumāhiehie and published in *Ka Naʻi Aupuni* from 1905 to 1906. The story details the travels of Hiʻiaka, Pele's favorite and most loyal sister, throughout the Hawaiian Islands, referencing significant place names, resources, and characteristics specific to each region along the way.

When Pele encountered the young chief Lohiʻau on Kauaʻi Island, he asked her to present a *hula*, to which she recited the winds of Kauaʻi, including those of Niumalu, Hanamāʻulu, and the Līhuʻe plains:

> The wind of Niumalu is a Kāhilipiʻi
> The wind of Pāpālinahoa is a Waiohue
> The wind of Nāwiliwili is a Huʻeone
> The wind of Kalapakī is a Wāmua
> The wind of Ahukini is an ʻEhukai
> A Pāhola wind is the scout that fetches the winds
> Sweeping the Līhuʻe plains
> The wind of Kapaia is a Kuliʻāhui
> The wind of Hanamāʻulu is a Hoʻoluakoʻinehe.
> (Nogelmeier 2006:17)

Pele called to all the winds, and at the end of her summoning, strong gales blew from all directions, stirring a great storm and powerful ocean waves. Pele told Lohiʻau:

> Listen to me. You should recognize that when the wind rises up, so does the storm. Each of those winds whose names I recited from Nihoa to here on Kauaʻi are the guardians of the storm and the calm over land and sea. It is the winds that bring together and assemble the

> racing clouds of the heavens until they unite in one place, and then the rain falls from the sky.
>
> Indeed, the winds of each district that I recounted are the spirits (guardian angels) of those places, and they respond when called, like the recitation I just did. (Nogelmeier 2006:26)

After being overcome by lava, Lohiʻau was brought to life again and taken to Ahukini. Upon arrival at Hanamāʻulu, he was struck by the lack of resources. Regarding Lohiʻau's experience in Hanamāʻulu, Rice recorded the following:

> Two brothers of Pele who had come from foreign lands, saw Lohiau's body lying as a stone where the lava flow had overtaken him. Pity welled up in their hearts and they brought Lohiau to life again. One of these brothers made his own body into a canoe and carried the unfortunate Lohiau to Kauai, where he was put ashore at Ahukini.
>
> Coming to Hanamāʻulu, Lohiau found all the houses but one closed. In that one there were two old men, one of whom recognized him and asked him to enter. The men were making tapa which they expected to carry soon to Kapaa, where games were being held in honor of Kaleiapaoa and his bride, Hiiaka. (Rice 1923:16-17)

This *moʻolelo* is reminiscent of the *ʻōlelo noʻeau*: "No Hanamāʻulu ka ipu pueu," (Pukui 1983:252) which refers to the stinginess of Hanamāʻulu's residents and is detailed in Section 3.1.3, below.

<u>Kuapakaa</u>
Hanamāʻulu is also mentioned in the Legend of Kūapākaʻa, when King Keawenuiaʻumi sailed to find Pākaʻa and bring him back into his service. Kūapākaʻa was the son of Pākaʻa, who was the son of Laʻamaomao, who could control the winds. Pākaʻa kept the bones of his mother in a calabash that was called "the wind calabash of Laamaomao" (Fornander 1918:72). Pākaʻa had been highly favored by Keawenuiaʻumi, and was raised to the highest office in his household and given command of the king's canoe. However, Keawenuiaʻumi became displeased with Pākaʻa and granted the powers and privileges he once enjoyed to two new men, Hoʻokeleihiho and Hoʻokeleipuna. Pākaʻa was left only with overseeing the personal effects of the king, and so he departed, placing Keawenuiaʻumi's *kapa*, *malo*, and other effects in the calabash. After this, Kūapākaʻa was born on Molokai and trained by his father to serve the King, in case Keawenuiaʻumi realized he missed Pākaʻa and searched for him to return.

When the King and his retinue came to Molokai to find Pākaʻa, he obscured his face and had his son speak to the king and his chiefs. Kūapākaʻa upset many of Keawenuiaʻumi i's chiefs by calling each of them out by name, telling them they were not chiefs by birth, and listing the faults of their districts. Kūapākaʻa then chanted about the sea, predicting a dangerous storm that would prevent Keawenuiaʻumi from landing safely in Kaʻula, on Hawaiʻi Island (Pukui et al. 1974:93). However, Keawenuiaʻumi's men were skeptical about Kūapākaʻa's predictions and called him a deceiving boy, as they saw no clouds, rain, wind, or lightning. When Kūapākaʻa told his father that the chiefs advised Keawenuiaʻumi to press on, Pākaʻa told him to call out for the winds of Hawaiʻi. Keawenuiaʻumi became angry with Kūapākaʻa for calling for the winds and began to sail off. Pākaʻa, then instructed him to call for the winds of Kauaʻi and Niʻihau, which he did, including the winds of Hanamāʻulu: "The kaao is of Hanamaulu" (Fornander 1918:96). Kāʻao is identified as a favorable wind associated with Hālawa, Molokai as well as Hanamāʻulu, Kauaʻi (Pukui and Elbert 1986). Keawenuiaʻumi and his men still believed they were being deceived, even after Pākaʻa recited the names of all of the King's men. As Keawenuiaʻumi and his retinue continued to withdraw, Kūapākaʻa

uncovered the wind calabash, La‘amaomao, which brought forth a mighty storm and finally induced Keawenuia‘umi and his men to land on Molokai (Fornander 1918:100-108).

Kaweloleimakua

Kaweloleimakua, known as Kawelo, was born in Hanamā‘ulu, Kaua‘i. He later went to Wailua to be raised by his grandparents, and grew up with Aikanaka, the son of the King of Kaua‘i, and Kauahoa of Hanalei. Kawelo’s older brothers moved to O‘ahu, and Kawelo and his grandparents later left Wailua to be with them. They made their home in Waikīkī, and Kawelo took up farming and married Kanewahineikiaoha. While Kawelo was on O‘ahu, Aikanaka took possession of all the lands owned by Kawelo’s parents in Hanamā‘ulu, leaving them “without land to cultivate or sea to fish in; in fact, they were left destitute. Their one food was head lice and nits” (Fornander 1918:14). Kawelo’s sisters, Kaweloikiakoo and Kooakapoko, sent messengers to O‘ahu to retrieve Kawelo so he could wage war against Aikanaka and reclaim the lands. Kawelo sailed back to Hanamā‘ulu and when they were just offshore, his uncles chanted to Kawelo:

> Say, Kaweloleimakua,
> Let us land, let us land.
> Say offspring from the cliffs of Puna,
> The eyes of Haloa are looking from above,
> My lord, my chief.
> (Fornander 1918:32)

They desired to land at Hanamā‘ulu to see Kawelo’s parents and older brothers and cook food, but Kawelo refused and said they should point the bow to Wailua. They landed and made war with Aikanaka and his men at Wailua. Kawelo was victorious and redivided the lands of Kaua‘i. He gave Ko‘olau to Kalaumeki, Puna to Kaeleha, Kona to Kamalama, and the whole of Kaua‘i went to Kawelo himself (Fornander 1918:32-62).

Following the battle, Kawelo and his wife Kanewahineikiaoha resided in Hanamā‘ulu. Aikanaka, defeated, went to the uplands of Hanapēpē and lived in constant toil. Kawelo was still living in Hanamā‘ulu when Aikanaka and his son-in-law plotted another uprising against him. A messenger arrived to Hanamā‘ulu to tell Kawelo that Aikanaka and his son-in-law were gathering stones in preparation of another conflict. Kawelo traveled from Hanamā‘ulu to Wahiawa to once again battle with Aikanaka. Kawelo came back from near-death to once again defeat Aikanaka and returned to Hanamā‘ulu and spent the rest of his days living there in peace with his parents and his wife (Fornander 1918:62-71).

Waawaaikinaauao and Waawaaikinaaopo

Another *mo‘olelo* discusses two brothers who lived on the flats of Nukole, between Hanamā‘ulu and the Wailoa Stream. This is likely referring to Nukoli‘i, the name of the beach area on the boundary of Hanamā‘ulu and the Wailoa Stream. Two brothers, Waawaaikinaauao (The-Wise-One) and Waawaaikinaaopo (The-Stupid-One) went inland up the ridge, Ka‘ili‘iliahinale, to collect birds one day (Wichman 1998:62-63). Waawaaikinaauao told his brother that all birds with two holes in their beak bore his mark, and therefore, all of them caught by his brother must be given to him. At the end of the day, he had all the birds, and Waawaaikinaaopo had none. Waawaaikinaaopo went to their mother and told her what had happened. She gave him some breadfruit gum and instructed him to pluck the feathers from the birds he caught, give the birds to his brother, cover his body in the breadfruit gum, and then roll in the feathers. He snuck up on his brother and cried, “Apau! The akua of the mountain is after you! He will grab you!” (Rice 1923:49). His brother was frightened and

dropped his birds, which Waawaaikinaaopo then picked up and kept as his own. Waawaaikinaauao eventually tried his trick again, this time while fishing, telling Waawaaikinaaopo that all the fish with two eyes bore his mark. Eventually, though, Waawaaikinaaopo caught a fish from the deep sea which had only one eye. This fish was his to take home, righteously (Rice 1923:49-50).

Pueo and the Keʻalohiwai Caves

Across the bay from Ahukini are Nā-pali-ʻoʻoma-o-Hanamāʻulu, "concave cliffs of Hanamāʻulu," described by Wichman (1998:62):

> Here lived a young man named Pueo. It was time for him to choose a wife, but he had not found anyone on Kauaʻi who compared to the woman he saw in his dreams. He went to Oʻahu and there he heard of a young woman named Ke-ʻalohi-wai. She had refused to marry any of the men her parents had presented to her, saying that the man of her dreams would come for her. When Pueo and Keʻalohiwai met, they recognized each other immediately. They married and lived for many years at Pali-ʻoʻoma. After their deaths, the cliffs were renamed Ke-ʻalohi-wai in honor of the dream woman from Oʻahu. (Wichman 1998:62)

This *moʻolelo* is also cited by others as the reason for the renaming of the caves (Aukai n.d., as cited in Soltz et al. 2014:16)

Kalauokamanu

Wichman (1998:61-62) and Soltz et al. (2014:16) describe a *heiau* located at Hanamāʻulu called Kalauokamanu, meaning the "tip of the endpiece of the canoe." The *heiau* was described as "a large walled heiau that stood above the present mill [in Hanamāʻulu]; destroyed about 1855. Of pookanaka class" (Bennett 1931:125). *Poʻokanaka heiau* were of human sacrificial function. According to Wichman (1998:61-62), travelers passing by the *heiau* would move quickly, holding their noses to avoid the stench of the bodies. This *heiau*, as described, is no longer standing, and the stones were used to build the Hanamāʻulu Sugar Mill (Bennett 1931:125).

In 1885, Lahainaluna School students conducted a study of the *heiau* and reported the following:

> Kalauokamani (Kalauokamanu) was another heiau. It was named for a real woman and this is a little story pertaining to it:
>
> Two men came from Kauai, Uukanipo and Kaipoleimanu. While they lived at Kahikimaiaea, they heard of the beauty of Kalauokamani and went in search of her until they arrived in the upland of Wailua. Kalauokamani was dead but her spirit saw the men, followed after them and asked, "Where are you going?" They answered, "To see Kalauokamani to be our wife." The spirit said, "There is no woman, for she is dead." The spirit again warned them, "Do not go up this way but go down below. There is the woman for you, Moeapakii. Do not go up this way lest you smell the stench of the body of the woman [you seek] for she lies unburied. The men insisted on going up on the upper side of Wailua and they did smell the stench of the woman and both died. They stand at Kaohokaualu to this day. Both had turned to stone. (Lahainaluna Students 1885 in Bishop Museum Archives, Hawaiian Ethnological Notes I:218 as cited in Soltz et al. 2014:16)

Wichman described the *heiau* as follows:

> It was greatly feared because of the many human sacrifices that were made there. The stench from the *heiau* was so bad that travelers would hurry past holding their noses. This was a

> large walled temple that was destroyed in 1855 to make the foundations for the Hanamāʻulu sugar mill.
>
> Beside it are two stones whose story remains but whose names are lost. Chief ʻUʻu-kani-pō was betrothed to Ka-lau-o-kamani, a chiefess of Hanamāʻulu and, with a friend, Ka-ipo-lei-manu, came to see her. They were walking down the path toward Kalepa from Kilohana Crater when they were accosted by a woman. The chief recognized his betrothed, Kalauokamani. "Turn back!" she said. "Do not go near Kalauokamanu. Go toward the mountains. There you will find my sister, Moeapakiʻi. It is she you must marry." ʻUʻukanipō realized that he was seeing the ghost of his beloved and determined to find out what had happened to her. Ignoring her warnings, the two hurried toward the village. When they came near Kalauokamanu, the stench was so strong that the two men were overcome and turned into rocks that guarded the path, warning all travelers of the danger ahead. (Wichman 1998:62)

No Hanamāʻulu ka Ipu Puehu

The *moʻolelo "*No Hanamāʻulu ka Ipu puehu", which has been translated by Wichman (1998:61) as "at Hanamāʻulu the calabash is empty," was detailed by Wichman as follows:

> One time, some travelers from Kona district reached the valley rim where they saw people peeling taro and heard the sound of *poi* pounders coming from the village. The travelers were pleased to know there would be fresh *poi* at the end of their journey, so they hurried down the path. When the arrived at the village, they found no *poi* at all, only villagers with sad faces apologizing for the lack of food. The visitors went hungry that night. Of course, the story was spread and from that time on the Hanamāʻulu people were known as stingy and miserly. (Wichman 1998:61)

Niumalu

Many of the oral historical accounts of Niumalu discuss the botanical landscape, including coconut trees, which are associated with the place name, as well as *mokihana*, a tree endemic to Kauaʻi. *Mele* recount the beauty of the area and its importance. Alakoko Fishpond is one of the most storied locations in Niumalu Ahupuaʻa, and the building of the *loko iʻa* (fishpond) is often attributed to *menehune* (legendary race of small people who worked at night) who were commissioned by *aliʻi*.

The Legend of Kapūnohu

Niumalu means "shade [of] coconut trees" (Pukui et al. 1974:166)and is associated with the Legend of Kapūnohu, who was born in Kukui-pahu's district and gained the leading ghost spirit of Hawaiʻi, Kani-kaʻa, as his *akua* (god). One day, the spirit was using his spear, Kani-ka-wi, when Kapūnohu picked it up and ran with it until Kani-kaʻa had to call a truce. With this new power, Kapūnohu found that he could throw his spear through 800 *wiliwili* trees in a line. Kapūnohu took Kani-ka-wi and with Kani-kaʻa as his ally, he avenged an insult from his brother-in-law by winning from him the entire district. He gave the district to his brother-in-law's rival, Niuliʻi, and then married Niuliʻi's daughters. Kapūnohu went on to kill Kukui-pahu at Kapaau in Ainakea, the warrior Paopele, and Kakuihewa on Oʻahu. Kapūnohu then went on to Kauaʻi, where he landed at Poki and Waimea, and settled at Koloa. In Niumalu, Kapūnohu won a throwing contest against Kemamo, the strong man of Kauaʻi. Kapūnohu staked his life against Kemamo, and during the contest, Kemamo made a good cast of his slingstone, but Kapūnohu's spear cleared the coconuts at Niumalu and entered the water at Wailua (giving the name Kawelowai), which dashed the spray (giving the name Waiehu), pierced the cliff at Kalalea, and went on to Hanalei (Beckwith 1940:419). Kapūnohu then became king of

Kauaʻi (Fornander 1918:224). Waiehu (also spelled Waiʻehu) is the ancient name for the waterfall in the south fork of the Wailua River (today called Wailua Falls), and the cave behind Waiʻehu is called Ke-ana-o-Kawelo-wai, or just Kawelowai, meaning "cave of Kawelo-wai." It has now fallen in (Wichman 1998:79).

An alternate interpretation of this *moʻolelo* and the name Niumalu is given by Fornander (1918:224), "Kapunohu then threw his spear, darting along from Koloa and over Niumalu, and as it shielded the sun from the coconut trees at this place the land was given the name of Niumalu, as known to this day," because "shaded coconuts" is one definition of Niumalu (Fornander 1918:224). This interpretation suggests that the coconut trees were shaded by the spear, rather than doing the shading as other *moʻolelo* would suggest (Fornander 1918:224, Wichman 1998:57). Either way, Niumalu is associated with coconut trees and the Legend of Kapūnohu.

Alakoko Fishpond

One of the most storied locations in Niumalu Ahupuaʻa is Alakoko Fishpond (also written as ʻAlekoko, Alekoko, and/or Menehune Fishpond). According to *moʻolelo*, Alakoko Fishpond was constructed by the *menehune* of Kauaʻi. There are many versions of the *moʻolelo* which have been passed down; however, only those with cited or inferred Hawaiian sources are summarized herein. The earliest written form of the *moʻolelo* identified during an archival search was written by S.K. Kawailiula, who described himself as "a native son of that lowland." It was published in the Hawaiian-language newspaper *Ka Hae Hawaii* on October 9, 1861 and later translated by Mary Kawena Pukui (Hawaiian Ethnological Notes Collection (HEN) 1861). According to Kawailiula, the "*melehuna*" (signifying "innumerable") were supernatural beings. One of their members, named Pi, resided at Hulēʻia during the time when the *aliʻi* of that area and his men had begun the construction of a "huge taro patch called Alakoko, to separate it from the river." The men worked very hard, but the work was difficult, and the progress was slow. Pi, on the other hand, just slept through the day. Because he did not help, Pi was called lazy and not given any food for payment. His wife, ashamed, berated him for not providing for his children. So, one morning, Pi woke and travelled to the uplands. There he gathered and cooked large quantities of *kalo* to make into innumerable bundles. He then tied all the bundles to a large *kukui* (candlenut) tree.

Pi uprooted the tree and carried it down to the pond. That night, he called up the other *menehune,* and they set to work building the pond, passing each stone along a line. When day came, the *aliʻi* and his men came to work as usual and found the pond completed. The *aliʻi* then sent his men to Pi's house with payment of fish and *kapa*. Pi did not share his food with the other men, as they had not shared with him. When news of this great feat reached the ears of Ola, the *aliʻi nui* (paramount chief) of Waimea, he sent for Pi to help construct a great water channel, Kikiaola.

In a version collected and translated from Hawaiian by Thomas Thrum, the *menehune* were commissioned by two sibling *aliʻi*, who resided along the Hulēʻia River in the area of Niumalu, to construct two fishponds (Thrum 1920:70-75). The brother, Alekoko, could assume the form of a *manō* (shark), while his sister, Kalalalehua, could assume the form of a *moʻo* (lizard). The *menehune* came and built the two fishponds in one night; however, while Alekoko's fishpond on the north side of the river was completed, Kalalalehua's fishpond on the Kīpū (south side) was not quite finished at dawn when the *menehune* left for the uplands.

A well-researched 1936 newspaper article on Alakoko Fishpond and its Hawaiian caretaker, John Coney, gives a slightly different version of the above *moʻolelo* (Honolulu Star-Bulletin 1936:45, 51). Although the source of the *moʻolelo* is not cited per se, the article is based on in-depth interviews

with Mr. Coney and Hawaiian fishing families of the area. In this version, Alakoko had the *menehune* men build his fishpond, while Kalalalehua had the *menehune* women build hers. The rocks were passed down along "the Makale point trail which goes over Hooku into Kipukai and from there to the Makaweli plains." At dawn, the *menehune* women were still on the Kipukai side of the trail and were hit by the rays of the sun and turned into stones. Kalalalehua's fishpond was said to be visible only at low tide. According to the wisdom collected for the newspaper article, the name Alakoko signifies "bloody wave, because the sea food growing in the pond gave the ripples of the water a reddish cast when the sun was shining" (Honolulu Star-Bulletin 1936:45).

Additional details and insights were collected by William H. Rice and published in 1923 (Rice 1923:34-37). Rice grew up on Kauaʻi, spoke Hawaiian fluently, and avidly sought out older Hawaiians who knew *moʻolelo* (Rice 1923:i[preface]). The following recounting was obtained from Reverend Joseph Apukai Akina, who grew up in Waimea in the 1850s–1870s:

> The Menehune were a small people, but they were broad and muscular and possessed of great strength. Contrary to common belief they were not possessed of any supernatural powers, but it was solely on account of their tremendous strength and energy and their great numbers that they were able to accomplish the wonderful things they did… One curious thing about the Menehune was that they never worked in daylight, as they never wanted to be seen. It was their rule that any enterprise they undertook had to be finished in a single night… They also built many heiau… All the stones for these heiaus were brought from Makaweli. The Menehune formed two lines, and passed the stones from man to man…
>
> The Menehune built the wall of the Alakoko fish pond at Niumalu. Standing in two rows they passed the stones from hand to hand all the way from Makaweli to Niumalu. Daylight came before they had finished the work, and two gaps were left in the wall. These were filled in by Chinamen in later years. (Rice 1923:34-37)
>
> …Pi was the kahuna of Ola the high chief. Pi summoned the Menehune to build the water course known as Kiki-a-Ola. Ola was ever thinking of improvements for his people, and his faithful laborers, the Menehune, carried them out. (Rice 1923:46)

Ching et al. (1973:28) recounted the following *moʻolelo* about Alakoko Fishpond:

> Living in the valley between the Kipu River [Hulēʻia] and Niumalu resided Alekoko, the brother, and Ka-lala-lehua, the sister, young chiefs of handsome countenance, who agreed together to construct a fishpond each for themselves. The work on these fishponds was done by the menehunes, it was done in one night (during the night of akua, on which there was a full moon). Stones for the walls were gathered from as far away as the sea beach of Makalii.
>
> (The pond of the brother was built on one side of the river, while the pond of the sister was built in the opposite bend in the river below Kalaeakapapa Point. The menehune women built the sister's pond, and the menehune men built the brother's pond.) As dawn approached the menehunes fled to the mountains. (The sister's pond was never completed.)
>
> The sister, seeing her fishpond was incomplete, was grieved and wept at its unfinished state, while the brother rejoiced at the completion of his. The stones gathered for the sister's pond still remain in the stream to this day. (Ching et al. 1973:28)

Wichman (1998:57-58) described the construction of Alakoko Fishpond as follows:

> The pond was built at the request of Chief ʻAlekoko and Chiefess Ka-lālā-lehua, who were brother and sister. The Menehune insisted that these two must remain inside their house and must not peek out at the work in progress. Through the long night and most of the day, the two listened to the voices of the Menehune and heard the sounds of stone falling on stone. At last curiosity won out, and the brother poked his fingers through the grass thatch of the house and peered out. Immediately the Menehune chief ordered his people to drop the stones they were holding and wash their hands in the almost completed fishpond. The rocks were not water polished and there was not a hand that wasn't bleeding from several cuts. The Menehune left the dam unfinished as a reminder to Chief ʻAlekoko of his broken promise. The fishpond still bears his name: ʻAlekoko, "rippling blood." (Wichman 1998:57-58)

Mele

A number of *mele* (songs) reference Niumalu specifically. Bowers (1984 as cited in Faʻanunu et al. 2012:17-18) compiled the lyrics to over two dozen *mele* about Kauaʻi. The *mele* are attributed to a variety of composers, some of whom are unknown, and most were likely written in the twentieth century, based upon their style. These *mele* speak to the beauty of and the love for Kauaʻi that is felt by its residents and admirers.

The *mele* entitled "Kaulana ka inoa aʻo Kauaʻi" (Bowers 1984:2 as cited in Faʻanunu et al. 2012:17-18), attributed to a recording (Music of Old Hawaii) by the Sons of Hawaiʻi references Niumalu and the *mokihana* tree (*Melicope anisata;* also known as *Alani, Alani kuahiwi, and Mokehana*):

Kaulana ka inoa aʻo Kauaʻi	Famous is the name of Kauaʻi
Kuʻu lei mokihana poina ʻole.	My unforgettable mokihana lei.
Ku kilakila ʻoe Waiʻaleʻale	Waiʻaleʻale you stand majestic
Me ka nani kaulana ʻo Nawiliwili.	With the famous beauty of Nawiliwili.
Lauaʻe o makana kaʻu aloha	I love the fragrant fern of Makana
Me ka uapo nani aʻo Niumalu	With the fine wharf of Niumalu.
E piʻina I ke ʻike aʻo Kipu	Ascending to see Kipu
Me ka wai ʻanapanapa e kaulana nei.	With the famous glittering waterfall.
I aloha ia noaʻo Waimea	Beloved is Waimea
Me ke one kani la aʻo Nohili	With the barking sands of Nohili.
Puʻili kou aloha ma kuʻu poli	Your love is held fast in my heart
Honehone kou leo me he ipo ala.	Sweet your voice like a sweetheart.
Hea aku no au, e o mai ʻoe	I call, you answer
Lei ana Kauaʻi ka mokihana	Kauaʻi, decked in mokihana.

(Bowers 1984:2 as cited in Faʻanunu et al. 2012:17-18)

The *mokihana* is an endemic tree, found only on Kauaʻi. It is a variety of *ʻalani* (citrus tree). *Mokihana lei* are a symbol of the island of Kauaʻi and the *mokihana* seed *lei* were the most treasured and rare seed *lei* in the Hawaiian Islands (Krauss 1993:70, 77-78, 238, Native Plants Hawaiʻi 2009).

Another *mele* references the rustling leaves of Niumalu, perhaps the coconuts that are the namesake. The *mele* "Līhuʻe" was recorded by Clark (1990:2 as cited in Faʻanunu et al. 2012:19):

Aloha ʻia no au Līhuʻe	Beloved is Līhuʻe.
I ka neʻe mai a ka ua Paupili	When the Paupili rain comes.
Ua pili no au me kuʻu aloha	I cling to my beloved
Me ke kau nehe mai au Niumalu.	Under the soft rustling [leaves] of Niumalu.

(Clark 1990:2 as cited in Faʻanunu et al. 2012:19)

3.1.3 ʻŌlelo Noʻeau

Hawaiian proverbs, or *ʻōlelo noʻeau*, have been passed down through oral traditions. Many *ʻōlelo noʻeau* have been collected and published in Hawaiian-language newspapers and other primary and secondary sources. The *ʻōlelo noʻeau* presented below were compiled by Mary Kawena Pukui in the book entitled *ʻŌlelo Noʻeau Hawaiian Proverbs and Poetical Sayings* (P. These *ʻōlelo noʻeau* often have both a literal and metaphorical meaning (called *kaona*). *ʻŌlelo noʻeau* about geographical features and areas can help us to understand natural phenomenon, land use, and the history of a place. A selection of *ʻōlelo noʻeau* pertinent to the project area and its surroundings are compiled here, along with their translations and interpretations from Pukui (1983).

One *ōlelo noʻeau* references Hanamāʻulu directly, though rather unfavorably:

> 2320. No Hanamāʻulu ka ipu puehu.
> The quickly emptied container belongs to Hanamāʻulu.
> (Said of the stingy people of Hanamāʻulu, Kauaʻi—no hospitality there. At one time, food containers would be hidden away and the people of Hanamāʻulu would apologize for having so little to offer their guests.)

By contrast, the *ōlelo noʻeau* that speaks more broadly of the Puna region of Kauaʻi references its beauty:

> 838. He nani wale no o Puna mai ʻo a ʻo.
> There is only beauty from one end of Puna to the other.
> (There is nothing to complain about. Refers to Puna, Kauaʻi.)

An *ōlelo noʻeau* about Kilohana discusses an old trail in the area which ran from Kona to Koʻolau:

> 2467. O Kilohana ia, he ʻaweʻawe moku.
> That is the Kilohana of the broken bundle cords.
> (Said of Kilohana above Līhuʻe on Kauaʻi. An old trail went by here, leading from Kona to Koʻolau. Robbers hid there and waylaid lone travelers or those in small companies and robbed them of their bundles.)

No *ōlelo noʻeau* specifically reference Nukoliʻi or Niumalu.

3.1.4 Settlement and Land Use

Hanamāʻulu was permanently inhabited and used intensively during the pre-Contact period. In coastal Hanamāʻulu, there were permanent habitation sites, *heiau*, and numerous trails crossing the landscape. Intensive agriculture was practiced across Hanamāʻulu, including *loʻi kalo* (irrigated pondfields with taro). Handy (1940) provided the following description of Hanamāʻulu:

> Hanamaulu River, rising below Kilohana Crater, winds its zigzag way to the sea through a relatively broad gulch, which had many small terraces commencing at a point about 2.5 miles up from the sea and continuing down the delta of the river which begins about a mile inland. The small terraces inland from the highway are unused. The delta region is a continuous area of flatland now mostly under sugar cane and house sites. Formerly this must all have been planted in taro. The small valley (Kapaia?), opening out northwest from Hanamaulu about 2 miles inland, has a number of small terrace areas. (Handy 1940:67)

When Handy observed Hanamāʻulu, the area had been affected by sugarcane cultivation and changing land use. However, the remnants of past use were still visible on the landscape and the former activities could be extrapolated from this information. Handy and Handy (1972) noted that farming in Hanamāʻulu would have included growing of taro within the stream delta and sweet potato in the upland slopes, along with coconut, and breadfruit.

Handy (1940:67) observed that despite the small size of Niumalu Ahupuaʻa, it was one of the most important areas for fishing on Kauaʻi. It was also home to Puali Stream and Halehaka Stream, the former of which irrigated a large swath of terraced agricultural lands. There were also *loʻi* at the *makai* (seaward) ends of Puali Stream and Halehaka Stream (Handy and Handy 1972:427). Like Hanamāʻulu, Niumalu was home to permanent habitation sites.

Archaeological, historical, and oral historical documentation indicate that Hanamāʻulu and Niumalu Ahupuaʻa were home to permanent habitation sites and were utilized extensively for agriculture and other subsistence activities. In coastal areas, permanent and temporary habitation sites, *heiau*, *koʻa* and *kūʻula* (fishing shrines), trails, and fishponds have been documented. House sites and intensive cultivation was concentrated in the valleys of Nāwiliwili and Hulēʻia Streams. Villages were located at Ahukini, Hanamāʻulu, Kapaia, Nāwiliwili, Niumalu, and Puhi.

Rice (1914, reprinted by Kauaʻi Historical Society 1991:47-48) observed that there were several large *heiau* in Puna Moku, including one that was located at the foot of Kālepa, just above the Hanamāʻulu Sugar Mill, with some of the stones from the *heiau* being incorporated into the mill's foundations. This is likely Kalauokamanu Heiau, of *poʻokanaka* class.

Alakoko Fishpond was one of the most important and storied fishponds in Niumalu Ahupuaʻa, as evidenced by its prominence in *moʻolelo* that have been discussed. Alakoko Fishpond is referred to as such in Land Commission documents, but is alternatively referred to as Alekoko, ʻAlekoko, and/or Menehune Fishpond in other sources. It is a large (ca. 39-acre) *kuapā*-style *loko iʻa* (fishpond), located along an elbow of the Hulēʻia River, just prior to its issue into Nāwiliwili Bay. Hulēʻia River is the longest and largest of the many streams that flow (or flowed) into Nāwiliwili, including Pūʻali, Papalinahoa, and Nāwiliwili. The waters of Hulēʻia are augmented by many tributaries and derive from rainfall on distant Waiʻaleʻale, the ancient volcano of Kauaʻi and its tallest peak. As a major artery of freshwater through the southern portion of Puna, Hulēʻia River was an important resource for both traditional Hawaiian agriculture and aquaculture, and its wealth (*waiwai*) was shared by several adjacent *ahupuaʻa*. Along its middle to upper reaches, the

river formed the boundary between Haʻikū Ahupuaʻa on the north side and Kīpū Ahupuaʻa on the south. In this region, the river has cut down into the land to form a winding gulch with alluvial floodplains along the major meanders, ideal for wetland *kalo* farming. As the river reaches the ocean at Nāwiliwili Bay, the *ahupuaʻa* association is unclear. While nineteenth-century survey maps depict Haʻikū as cut off from the ocean and Niumalu Ahupuaʻa encompassing the river, according to Native Hawaiians from that area in the nineteenth century, Haʻikū had a section of coastline on the south of Hulēʻia River (Neller and Palama 1973:6). Handy and Handy (1972:426) also claim that Niumalu Ahupuaʻa did not encompass the river itself. Whatever the case, the Hulēʻia River is important to Niumalu Ahupuaʻa, amongst others in the area.

The presence of such a large and important *loko iʻa* near the mouth of the Hulēʻia River correlates with the superlative marine resources of Nāwiliwili Bay, which has been noted as one of the most important fishing localities on Kauaʻi (Handy and Handy 1972:427). Large numbers of *ʻamaʻama* (striped mullet, *Mugil cephalus*), *moi* (Pacific threadfin, *Polydactylus sexfilis*), and *akule* (Big-eyed scad, or mackerel, *Selar crumenophthalmus*) once thrived in Nāwiliwili Bay, and the Hulēʻia River was the spawning ground of the *ʻamaʻama.* The *ʻamaʻama* of Nāwiliwili were so prized that, according to the Hawaiian overseer of Alakoko Fishpond in the early twentieth century, they "have been tabu [*kapu*] since ancient times" (Honolulu Star-Bulletin 1936:45). The movements of the schools of fish were monitored from the high point of Kalanipuʻu, a *puʻu kāhea* (calling hill) located on the south side of the entrance to the bay and the river. Upon construction of the harbor breakwater, the large schools of fish stopped coming into the bay (Honolulu Star-Bulletin 1936:45).

In 1928 and 1929, W.C. Bennett from the Bishop Museum conducted a survey of sites on Kauaʻi. He documented Alakoko Fishpond, calling it the "Niumalu Fishpond" located near the mouth of Hulēʻia River (Bennett 1931). Bennett described the fishpond as one of two famous fishponds on the island of Kauaʻi. Bennett described it as "a stone faced dirt wall that runs for over 900 yards and cuts off a large bend in the river" (Bennett 1931:124). Handy and Handy (1972:426) state that Bennett was mistaken in his naming of the fishpond, "presumably an error owing to the proximity of the *ahupuaʻa* named Niumalu, adjacent to the Huleʻia River…The correct name of this pond is Alakoko."

Ching et al. (1973:113 [Appendix 6]) recorded *akule* as the *kapu* fish and *ʻŌhiʻa ho* (*Syzygium sandwicense* [*Ōhiʻa hā*] or *Metrosideros polymorpha* [*Ōhiʻa lehua*]) as the *kapu* wood for Niumalu Ahupuaʻa.

3.1.5 Early Post-Contact Period

The arrival of western naturalists, explorers, and industrialists to the shores of the Hawaiian archipelago rapidly accelerated after Captain James Cook first arrived at Waimea Harbor, Kauaʻi in 1778. The subsequent centuries are often referred to as the 'post-Contact' period, demarcating a period of significant transformation in Hawaiʻi's history that was highly influenced by increased interactions with Europe, the United States, and other regions. The following centuries saw the unification of the archipelago and the formation of an independent, constitutional monarchy under the Kamehameha Dynasty (1810-1874), followed by the Kalākaua Dynasty (1874-1893). It also saw the introduction of a wide range of plant and animal species, foreign diseases, and a rapid influx of foreign settlers and business interests. This latter introduction ultimately brought about the overthrow and annexation of the Hawaiian Kingdom by the U.S. in the late nineteenth century, followed by statehood in the mid-twentieth century. These significant social, political, and biological transformations had diverse and wide-ranging impacts on island ecosystems, land tenure

and use, and cultural practices. Around the year 1850, there were large Hawaiian settlements in the valleys of Niumalu and Hanamāʻulu, as well as in Halekaha and Nāwiliwili (Rice 1914, reprinted by Kauaʻi Historical Society 1991:47).

Hanamāʻulu Ahupuaʻa

Early European interest in Hawaiʻi was largely driven by the islands' convenient location in the Pacific and their valuable natural resources. Among these, sandalwood (*ʻIliahi, Santalum* sp.*)* emerged as Hawaiʻi's first significant export. Initially transported as firewood, sandalwood was later recognized for its high value, particularly in the Chinese market, where it was used in cosmetics, perfumes, medicine, religious ceremonies and ornamental objects. Because sandalwood did not grow in China, for generations it had been imported from India (Joesting 1984).

European explorers quickly recognized the commercial potential of Hawaiian sandalwood. In 1791, Captain John Kendrick left some of his crew in Niʻihau to search for pearls and sandalwood in Kauaʻi (Damon 1931:233). In 1792, Captain Vancouver met with two of Kendrick's men, who informed him of the easy access and abundance of sandalwood in the mountains of "Attowai" (Kauaʻi) and "Owhyhee" (Hawaiʻi) (Vancouver 1798). In contrast, Damon (1931) briefly observed that by 1903, the slopes of Mount Kālepa, just west of the Nukoliʻi Beach portion of the HIFL project area, appeared bare. Chief Forester C.S. Judd later stated, as Kendrick's crew had reported decades earlier, that the area had once been covered with sandalwood (Damon 1931), highlighting the impact of the industry on the region's natural resources.

Observations of Hanamāʻulu are documented by a few Western settlers. In the 1830s, Rev. Peter Gulick recorded the following in his journal during one of his mission trips along the coast from Hanamāʻulu to Wailua:

> I with a few natives had a comfortable house at Hanamaulu. The inhabitants brought us fish fresh from the ocean, fowls, taro, potatoes, and a pig, all except the fish roasted or baked in the ground. (Damon 1931:361)

In May of 1849, William DeWitt Alexander, son of the former Waioli missionary William Patterson Alexander, wrote in his private journal while traveling from Kōloa to Wailua:

> A few miles further on we crossed the picturesque valley of Hanamaulu. This valley is prettily bordered by groves of Kukui, koa, & hala trees, and is well cultivated with taro. A fine stream flows through the midst of it, which makes a remarkable bend at this place like a horse shoe. We then traveled along the seashore at the foot of a range of hills through groves of hau, & among hills of sand. It was now after dark, but the moon shone brightly, and there was no difficulty in finding our way. About eight o-clock we arrived at the banks of the Wailua river. (Alexander 1933, reprinted by Kauaʻi Historical Society 1991:122)

Around 1860, ten acres of cotton was planted at Konolea and a mill was installed in Hanamāʻulu, and for some time, cotton appeared to be a promising emerging industry. However, the lack of marked seasonal variation caused new blossoms and mature ones to appear at the same time. This required careful harvesting to avoid damaging the young growth, making the process labor-intensive and costly. Additionally, with the resumed cotton production in the southern states after the Civil War, market prices dropped, and Hawaiian cotton could no longer compete. In later years, the mill at Hanamāʻulu also processed some of the sugarcane planted in the region, including part of a 100-acre crop cultivated in the late 1870s (Damon 1931:376).

Niumalu Ahupuaʻa

The development of sugar plantations and settlement of westerners in the region marked the beginning of lasting changes to the area's traditional community and landscape. Today, the city of Līhuʻe stretches into Niumalu Ahupuaʻa (and Hanamāʻulu Ahupuaʻa), but in the early post-Contact period, the boundaries of the city did not extend this far. Little is recorded about Niumalu Ahupuaʻa specifically during this time, but due to its proximity to Nāwiliwili and Līhuʻe, information is presented on these areas to provide a general overview of the major events happening during the early post-Contact period.

Līhuʻe began to appear in reports and on maps around the 1830s (Joesting 1984:153) (Figure 27). Governor Kaikioʻewa built a large house and a church in the area, marking the first major attempt to develop the land, though homesteading and commerce was established on the lands above Nāwiliwili Bay almost as soon as Westerners began to settle on Kauaʻi. The name Līhuʻe was not used consistently until the establishment of commercial sugarcane agriculture in the mid-nineteenth century. From the 1830s to the time of the Māhele, the names Nāwiliwili and Līhuʻe were used interchangeably to refer to the settlement along Nāwiliwili Bay (Hammatt and Creed 1993). Some attribute the decision to use the name Līhuʻe to Governor Kaikioʻewa, who named it for his upcountry home. Nāwiliwili was not the preferred anchorage during this time, and whaling ships would often utilize Waimea and Kōloa Bays, as the winds were not as likely to blow their ships onto the rocks (Faʻanunu et al. 2012:28). In 1839, Reverend Doctor Thomas Lafon moved to Līhuʻe and assumed responsibility for the church. In 1849, Alexander described his experience returning to Kauaʻi, six years after his family left the island:

> We then rode through a gap in the hills, leading out from Koloa. The scenery was very fine, and worthy of Kauai. Mauna Kāhili was close on the left, and on the right a beautiful range of hills extending towards the northeast, and terminating in an abrupt peak which goes by the name of "Hoary Head" [Hāʻupu]. We rode on over a beautiful undulating table land, dotted with groves of lauhala and kukui. After riding about five miles, we crossed a stream fitly called Stoney Brook. We afterwards crossed many other streams on our way. Five miles further we passed Dr. Lafon's former residence. Here we began to descend towards the sea. (Alexander 1933, reprinted by Kauaʻi Historical Society 1991:122)

Alexander did not note any Hawaiian settlements between the gap and Dr. Lafon's former residence in the Līhuʻe area. However, it is likely that substantial settlement down in the Hulēʻia Stream Valley was largely obstructed from his view while he rode (Kamai et al. 2016:15).

The development of Līhuʻe stalled after Kaikioʻewa's death. When James Jarves passed through Līhuʻe in 1840, he observed the following:

> There is a fine tract of land which the late governor selected as a site for a plantation, many acres of which he caused to be planted with cane, and also built a large church, and a house for himself. But death soon terminated his scheme, and his city, that was to be, still retains its original diminutiveness, while all the improvements, like his own body, are wasting away to mother earth again. (Joesting 1984:53)

The expansion of the sugarcane industry activities in Kauaʻi brought many visitors and plantation personnel who required lodging. During the 1820s and 1830s, many found accommodations with Native Hawaiian families. Prominent Western settlers, such as the Rice family, also hosted numerous guests in their Līhuʻe home. However, as the number of visitors increased, private

lodging was no longer sufficient, and formal accommodation began to appear. Kauai‘s first hotel, the Fairview Hotel, was opened by Charles Spitz in 1890. William Hyde Rice’s oldest son, William Henry Rice, took over the hotel in 1894. The hotel was eventually renamed Lihue Hotel and eventually grew to 68 rooms (Images of Old Hawai‘i 2024).

Around the same time, population centers began shifting closer to sugarcane operations. Hawaiian population, once dispersed, gradually relocated closer to the new economic hubs. Traditional *kalo* lands in the valleys were replaced by rice cultivation, while sugarcane dominated the flatlands. Līhu‘e and surrounding areas evolved into a plantation-centered community, and Nāwiliwili emerged as a key harbor in the region (Joesting 1984:248-250).

3.1.6 The Mahele

In the mid-nineteenth century the Hawaiian Kingdom, under the leadership of King Kamehameha III (Kauikeaouli), undertook a momentous reformation of land tenure that had far-reaching and profound consequences for Native Hawaiians. The impetus for this transition arose from compounding pressures from outside entities: foreign traders, merchants, missionaries, and their governments desired control of private lands and contested the prerogative of the king and *ali‘i nui* (high chiefs) to distribute or revoke land rights at will according to traditional custom. The increasing danger of annexation by a European nation loomed large after the Paulet Affair in 1843, and with similar processes occurring throughout southern Polynesia. There were also unprecedented challenges with regard to integrating into a Western economic system, and the desire of the king to safeguard the rights of Hawaiians to their native lands, particularly in light of the mass loss of Hawaiians under the onslaught of introduced diseases (Van Dyke 2007:30-31, Chinen 1958:25).

In response to such pressures, Kamehameha III and his chiefs enacted the Bill of Rights in 1839, as an initial if limited attempt to define property rights. This was followed by the creation of the first constitution of the Hawaiian Kingdom in 1840, which established legislative and judicial bodies suited to addressing land ownership reformation. The Organic Acts of 1845 which further organized the executive branch and defined the king’s role and power in Western legal concepts. Also in 1845, the Board of Commissioners to Quiet Land Titles, commonly referred to as the Land Commission, was created. The Land Commission oversaw the adjudication of all land claims.
In December of 1847, the king and his Privy Council determined to initiate a division (*mahele*) of the kingdom’s lands; this became known as the Mahele. The initial *mahele*, which transpired between January 27 and March 7 of 1848, involved the division of the lands between the king and approximately 250 *ali‘i* and *konohiki* (headman of a land division under an *ali‘i*), wherein the king selected lands he would personally retain and quitclaimed all rights to the remaining land, and the *ali‘i* did the same. The 1848 Mahele was recorded in a legal document titled “Buke Kakau Paa no ka mahele aina i Hooholoia i waena o Kamehameha III a me Na Lii a me na Konohiki ana” (which was later known as the *Buke Mahele*, or Mahele Book). These land claims only involved the larger land divisions consisting of *ahupua‘a* and *‘ili kūpono* (*‘ili* situated within an *ahupua‘a* but independent from it).

After the 1848 Mahele, the king retained roughly 60 percent (ca. 2.5 million acres) of the Kingdom’s land (“Crown Lands”); however, he then apportioned 1.5 million acres of that land to the Government, which became known as “Government Lands.” The *ali‘i* ended up with between 56-74% of their original holdings, and these lands became known as “Konohiki Lands” (Kame‘eleihiwa

1992:219). Notably, during the initial *mahele*, land surveys defining the boundaries of the *ahupuaʻa* and *ʻili kūpono* land claims were not required and the claims were rewarded based on their traditional names only. In 1862, in order to address the lack of clearly defined boundaries and emergent land disputations, the Commissioner of Boundaries was created and all *ahupuaʻa* and *ʻili kūpono* award recipients were required to present land surveys for confirmation.

Soon after the 1848 Mahele, it became apparent that the land rights of the Native Hawaiian populace, or native tenants, needed to be ensured (Chinen 1958:29). In the Kuleana Act of 1850, the legislature authorized the *makaʻāinana* (general populace) to claim lands which they actively cultivated or inhabited. These became known as "Kuleana Lands." Kuleana Lands were often the most fertile of the lands in Hawaiʻi, as claims often centered on arable or cultivable land (Chinen 1958:31). Claimants were required to provide a professional land survey to the Land Commission as well as supporting testimony for their claim. Testimony was collected from neighbors, current or previous residents of the area, and the *konohiki* of that area, in either ʻŌlelo Hawaiʻi (Native Testimony) or English (Foreign Testimony). An awarded claim was termed a Land Commission Award (L.C.Aw., or L.C.A.) and assigned a *helu* (number). A Royal Patent was then issued which confirmed the government's quitclaim of interest to the land (Chinen 1958:14). These land claims were recorded in ten large volumes (LCA Books 1–10) and the associated testimonies are included within an additional 50 volumes. The survey maps and descriptive testimonies provided with the land claims contain invaluable information on land use practices and resources at that time period. Ultimately, however, the majority of the lands to be set aside for the *makaʻāinana* were not awarded or claimed, resulting in only 28,658 acres being distributed to the *makaʻāinana* (Kameʻeleihiwa 1992:295). Thus, much land shown as blanks on nineteenth-century maps was not necessarily unused land, but rather, land without written or illustrated legal records. Notably in this regard, not all *aliʻi nui* and *aliʻi* participated in the Mahele (Hopkins 2022).

The Alien Land Ownership Act, also issued in 1850, granted foreigners the right to own land. Beginning in 1845, foreigners were allowed to take the oath of citizenship, and by 1847, foreigners were allowed to hold lands but could only sell such lands to legal citizens of the Hawaiian Kingdom (Kameʻeleihiwa 1992).

The entirety of Hanamāʻulu and Niumalu Ahupuaʻa were awarded to Ke Aliʻi Victoria Kamāmalu as part of a *konohiki* award (LCA 7713, ʻĀpana 2). The *ahupuaʻa* of Niumalu was passed from Kamāmalu to her father, Kekuanaoa, then to her brother, Kamehameha V. Upon his death, it was inherited by her half-sister Ruth Keʻelikolani, who later sold the land to Paul P. Konoa in 1883 (Ching et al. 1973). Although no LCAs were identified within the portions of the HIFL project area and the immediate vicinity, there are around 20 *kuleana* parcels claimed within Hanamāʻulu Ahupuaʻa (Soltz et al. 2014) and 24 within Niumalu Ahupuaʻa (Kamai et al. 2016). Most of the awards in both *ahupuaʻa* are described as including *loʻi*, *kula* lands, and house lots (Kamai et al. 2016).

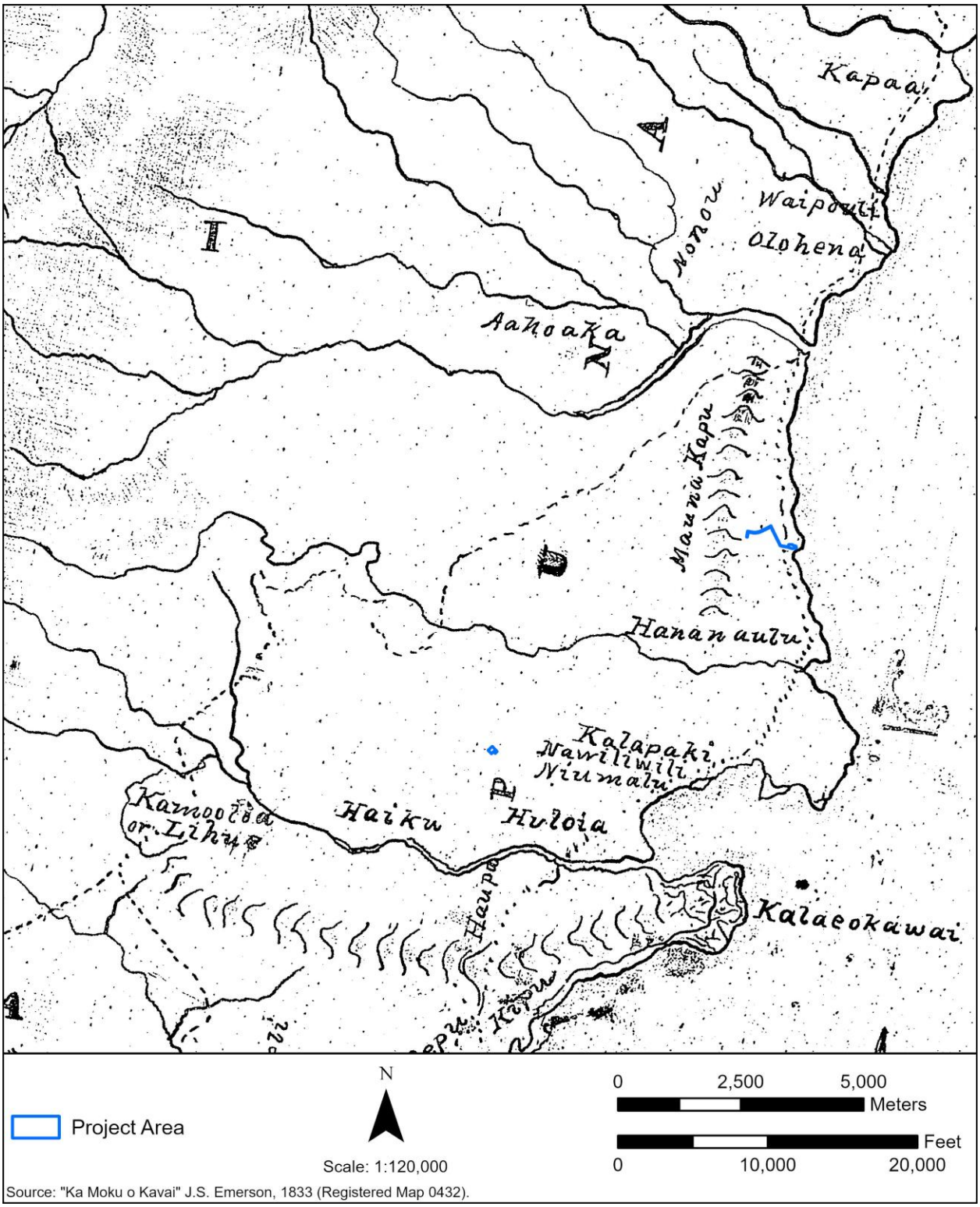


Figure 27. An 1833 Emerson map of Kauaʻi refers to some place names and geographical features. Note the presence of "Komooloa or Lihue" on the map in this year.

3.1.7 Sugarcane Agriculture

Sugar came to dominate economic, political, and social life in Hawai‘i as foreign influence continued to grow in the islands. The commercial cultivation of sugar on Kaua‘i began at Kōloa in 1835 and created a need for a larger supply of indentured, contract laborers, which later gave way to free wage workers (Riznik 1999:121-125). After the first plantation opened at Kōloa, the sugar industry on Kaua‘i took off. Three notable sites related to sugarcane agriculture are in the vicinity of the Kaua‘i portions of the HIFL project area: Lihue Plantation, Grove Farm, and Puhi Camp.

Lihue Plantation

The origin of Lihue Plantation traces back to 1849, when Henry A. Peirce, a seasoned Pacific trader from Boston, paused at Nāwiliwili Bay *en route* to China (Damon 1931:410). Struck by the fertile uplands, he partnered with William L. Lee, Chief Justice of the Hawaiian Kingdom, and Charles R. Bishop, a banker and the future husband of Ke Ali‘i Bernice Pauahi Pākī, to establish a sugar plantation at Nāwiliwili. Together, they founded Henry A. Peirce & Co. and purchased approximately 3,000 acres in Nāwiliwili, 300 acres in Ahukini, and an additional acre at Nāwiliwili Harbor for access to a landing (Damon 1931:410-413, Hibbard and Wichman 2008, Soltz et al. 2014:20). In 1859, William H. Rice also became involved in the enterprise, and around this time, Peirce sold his interest in the company, resulting in the firm being renamed to Lihue Plantation to reflect the new ownership (Conde and Best 1973:165).

Lihue Plantation stood out as the most advanced sugar operation in Hawai‘i during the 1850s. In 1853 it featured the first steam-powered mill in the islands, and from 1856 to 1859, Rice oversaw the design and construction of the 10-mile-long Hanamā‘ulu Ditch, the first large-scale waterworks project of its kind in Hawai‘i (Dorrance and Morgan 2000, Soltz et al. 2014:20). The new ditch brought reliable water from Kilohana Crater and greatly improved the plantation‘s sugar cultivation capacity.

Paul Isenberg joined Lihue Plantation in 1858 and by 1862, at the age of 25, became its manager, a position he held until 1878 (Conde and Best 1973:165, Soltz et al. 2014:20-27, Saito and Campbell 1987). In the early 1870s, following the death of Kamāmalu, Isenberg purchased the entire *ahupua‘a* of Hanamā‘ulu and estabilished Hanamā‘ulu Plantation as a separate company. The acquisition added 17,000 acre of land and secured essential water source for the sugar industry in the area (Wilcox 1996:68-73, Conde and Best 1973:165-167, Soltz et al. 2014:20-27, Saito and Campbell 1987). Figure 28 depicts Lihue Plantation’s lands in Wailua and Hanamā‘ulu Ahupua‘a in the year 1872 and Figure 29 depicts Lihue Plantation (and Grove Farm) sugarcane fields in 1878.

By the end of the 1870s, George N. Wilcox of Grove Farm had imported a mill from Scotland for his own plantation, but ultimately sold it to Lihue Plantation and continued to have his cane processed at the Lihue Plantation Mill. The purchased mill was constructed at Hanamā‘ulu to process the cane grown on the north side of Hanamā‘ulu Gulch (Saito and Campbell 1987)(Figure 30 and Figure 31). Hanamā‘ulu Sugar Company also operated its own railroad and wharf on the north side of Hanamā‘ulu Bay. The Hanamā‘ulu Sugar Company was absorbed by Lihue Plantation in 1898 and in 1920, the wooden rail systems were physically connected, integrating the Lihue and Hanamā‘ulu plantations’ infrastructure (Conde and Best 1973:165-167).

The early workforce at Lihue Plantation consisted primarily of Native Hawaiians working the fields while Chinese workers were employed in the mills (Saito and Campbell 1987). Over time, the plantation diversified its labor force with Japanese, Portuguese, Korean, and Puerto Rican workers. By the early 1900s, nearly 1,600 workers were employed by the company. Plantation housing was provided for the workers, and the plantation hospital was reported to be among the best in the Hawaiian Islands (Saito and Campbell 1987).

During the late nineteenth and early twentieth centuries, Lihue Plantation made substantial infrastructural investments to support its growing sugar operations. In 1891, a plantation railway system was constructed to replace ox carts (Saito and Campbell 1987). In the early 1900s, the plantation developed warehouse facilities and a landing was established at Ahukini in 1906 (Figure 30 and Figure 31), which replaced the older Hanamāʻulu steel trestle (Conde and Best 1973:165-167). By 1910, the plantation irrigation system had expanded significantly, which included 33 miles of ditches, four miles of tunnels, and 9,900 feet of water gearing flumes to support year-round cultivation (Saito and Campbell 1987). A USGS map from 1910 (Figure 31) shows an extensive network of railroad tracks. In 1921, Lihue Plantation Company sponsored the creation of the Ahukini Terminal & Railway Company (AT&R) which operated until 1934 between Ahukini and Keālia (Conde and Best 1973:165-167). Throughout the early twentieth century, prior to the construction of Nāwiliwili Port, Ahukini Pier served as the primary shipping port for both sugar and pineapples. By the early 1920s, mills in Lihue were using electricity from hydroelectric power (Saito and Campbell 1987).

In 1934, Lihue Plantation absorbed Makee Sugar Company, which was established in 1877 by King David Kalākaua, Captain James Makee, and George Macfarlane (Saito and Campbell 1987). By this time, Lihue Plantation had also acquired Nawiliwili Transportation Co., East Kauai Water Co., Princeville Ranch, Waiahi Electric Co. and pineapple lands leased to Hawaiian Canneries (Saito and Campbell 1987). These investiments made Lihue Plantation the second-largest sugar producer in the Hawaiian Islands, surpassed only by Hawaiian Commercial & Sugar Company (HC&S) on Maui.

Despite World War II interference to the sugarcane industry, including labor shortages, blackouts, and diversion of plantation land and production for military use, Lihue Plantation maintained strong sugar production levels throughout the years (Saito and Campbell 1987). In 1944, the company hosted the first Harvest Home Festival, attended by over 5,000 employees and friends, to celebrate a successful harvest. As veterans returned to the workforce after the war, Lihue Plantation achieved a record-breaking harvest in 1947, producing 59,417 tons of sugar. Post-war years also brought the installation of shortwave radio-telephone transmitters to connect all major operations across the plantation, as well as a new warehouse in Nāwiliwili, which used electric power shovels to fill the sugar conveyors (Saito and Campbell 1987).

Between 1976 and 1979, a sharp decline in global sugar prices led to the closure of at least 13 of Hawaiʻi's 27 sugar companies. By the end of the 1990s, only four remained in operation, including Lihue Plantation, which ultimately ceased operations in 2000 (Jones and Osgood 2015).

Grove Farm

George Norton Wilcox (often known as G.N. Wilcox) was born to missionary parents in 1839 in Hilo, Hawaiʻi Island. He was raised at Waioli Mission House in Hanalei, Kauaʻi and attended Punahou School in Honolulu (Krauss and Alexander 1984). In 1857, he began his career in the agricultural

industry when he took a job at Pierce Plantation (later known as Lihue Plantation). He was a store clerk and a bookkeeper for William Harrison Rice. While working for Rice, Wilcox saw the irrigation ditch that Rice had dug, which was the first *ʻauwai* (ditch) dug in the Hawaiian Islands to irrigate a crop other than those in a *loʻi.* Rice's irrigation ditch sourced water from the Hanamāʻulu Stream, northwest of Līhuʻe, and carried it to his sugarcane fields (Soboleski 2025).

Wilcox became interested in civil engineering and spent six months supervising the *guano* (bird dung) digging on Jarvis Island in 1859, which helped him to pay his tuition at Yale University, where he studied engineering. After college, Wilcox returned to Kauaʻi, where he began working at Grove Farm, one of the first sugarcane plantations in the Hawaiian Islands. Originally owned by Judge Herman A. Widemann, a German immigrant, the plantation was named after the grove of *kukui* (candlenut; *Aleurites moluccanus*) trees that grew in that area (Damon 1931). Ultimately, Widemann was unable to successfully procure enough water for the crop (Grove Farm Museum 2025). He hired Wilcox as a land surveyor and irrigation ditch supervisor, and then in 1864 leased Grove Farm to Wilcox (Grove Farm Museum 2025, Soboleski 2025). Grove Farm included about 400 acres of cane land, 500 acres of pasture, and a homestead, which adjoined Nāwiliwili Road. Wilcox developed an irrigation system that brought water from the mountains to the lower elevations to successfully water sugarcane crops at Grove Farm (Grove Farm Museum 2025).

In 1870, Wilcox bought Grove Farm, intending to pay off the $12,000 purchase over time. By 1874, he had paid for it in full and he was one of the most successful planters in the Hawaiian Islands at this time. An 1878 Government Survey Map shows present-day Līhuʻe town as the sugarcane fields of Grove Farm and Lihue Plantation, with Kaumualiʻi Highway depicted as an unimproved road (Figure 29). In 1881, Wilcox and William Hyde Rice purchased royal estates from Ke Aliʻi Ruth Keʻelikolani for $27,500. In this purchase, Wilcox obtained a 10,500-acre tract called Haʻikū, which began near Mount Kahili above Knudsen's Gap and extended toward Nāwiliwili and Niumalu (Soboleski 2025).

At the turn of the twentieth century, Grove Farm continued to expand its operations through significant improvements in infrastructure and housing. In the early 1900s, the plantation secured additional water rights, enabling the construction of the Upper Ditch between 1914 and 1917. By the 1920s, the irrigation system delivered up to 26 million gallons of water per day (Wilcox 1996:73-74).

Around 1917, Grove Farm began developing Puhi Camp to accommodate its growing workforce. Designed as a village-style community, it featured modern housing, running water, streets, gardens, and recreational areas (Krauss and Alexander 1984:310). During this same period, Grove Farm expanded its plantation railroad, using steam locomotives and portable track to move cane and workers across the property. Cane was hauled to the Lihue Plantation Mill for processing, continuing a long-standing partnership between the two plantations (Conde and Best 1973).

Wilcox was also primarily responsible for financing the Nāwiliwili Harbor Breakwater, which was constructed in 1926 (Krauss and Alexander 1984:323). In 1927, at age 88, he directed the building of the seawall, which was completed in 1928 ahead of schedule, despite numerous setbacks, all mediated and remedied by Wilcox (Krauss and Alexander 1984:324). This project involved the filling of the bay behind the seawall, which effectively removed the original shoreline between Kalapaki Beach and the *pali* (cliff) separating Nāwiliwili from Niumalu. Wilcox was considered to be very generous, and his bookkeeper estimated that in 1915, he had given $1,500,000 to charity. By 1920, it was estimated that he had donated over $3 million to charity. Wilcox served in the

Hawaiian Legislature, representing Kauaʻi, for many years and he was the Prime Minister for Queen Liliʻuokalani (Soboleski 2025).

Wilcox never married and had no descendants. He died on January 21, 1933, after being diagnosed with cancer, and was buried in the cemetery on the bluff above the Lihue Plantation Mill. His three brothers had children and carried on the Wilcox lineage (Krauss and Alexander 1984:328, Soboleski 2025).

After Wilcox's death, two of his nieces, Elsie and Mabel, were heavily involved with the management of Grove Farm. A number of Wilcox's other descendants took on roles in the running of Grove Farm in the years that followed (Krauss and Alexander 1984). In 1948, Grove Farm acquired Kōloa Plantation, gaining access to its own sugar mill for the first time (Krauss and Alexander 1984:366-368). This acquisition also optimized operations by reducing overlapping jobs, equipment use, and administrative costs. The expansion also led to several infrastructure projects, including the construction of the Wilcox Tunnel between 1948-1949, a cane haul tunnel bored under the Hoary Head Range (Hāʻupu) that connected the sugarcane fields at Haʻikū with the Kōloa Mill, and the nearly one-mile-long Kuia-Waita Tunnel in the early 1960s, which transported water from the Haʻikū region to the drier Kōloa side (Krauss and Alexander 1984:366-369). An airstrip was also developed at Haʻikū in 1954 for aerial application of fertilizers and herbicides to the cane fields (Kamai et al. 2016:32).

In 1969, Grove Farm underwent a merger with Alexander & Baldwin (A&B) (Krauss and Alexander 1984:401-402). In January 1974, Grove Farm ceased to function as a sugar plantation, after decreasing profits and worker unrest. Mabel Wilcox, G.N. Wilcox's niece, had an idea to turn the Grove Farm Homestead into a museum, and she worked on this vision until her death on December 27, 1978. Her dream was realized in the fall of 1980, when the Grove Farm Homestead opened as a museum to the public (Krauss and Alexander 1984:403-416) (Figure 30).

Puhi Camp

Prior to 1920, housing for plantation workers in Hawaiʻi was overcrowded, unsanitary and poorly constructed, reflecting the belief of most plantation owners that plantation workers were temporary and did not require long-term accommodations (Riznik 1999:125). Fifty to sixty workers were sometimes packed in a single wooden barrack with minimal privacy, poor ventilation, and inadequate sanitation, conditions that contributed to the spread of diseases and dissatisfaction among the workers. In an interview with Dr. Nils P. Larsen, a Chinese laborer who arrived in Hawaii in 1882 described his initial reaction to the living conditions of the plantation camp: "His first impression of the plantation camp was very sad. Where he had expected to see a roomy place, he found himself in a crowded camp house. They slept in double-decker beds, 24 to each room".

Reform efforts led by public health advocates and social workers, along with increasing demands by workers, began to change plantation housing. By the early twentieth century, some plantations began experimenting with new designs that offered more space, hygiene, and family-oriented living. Puhi Camp, built by Grove Farm around 1917 in the location of the present-day Kauaʻi Community College campus, came to be recognized at that time as model plantation housing in Hawaiʻi (Figure 32). The boundaries of Puhi Camp are within Haʻikū Ahupuaʻa (to the west of

Niumalu Ahupuaʻa) and are immediately southwest of the Kauaʻi Community College portion of the HIFL project area.

In 1919, Clinton S. Childs, commissioned by the Social Welfare Committee to conduct an extensive social survey of plantation conditions, described Puhi Camp as "the most advanced construction in the way of camp houses" (Riznik 1999:137). While many plantations were experiencing workers' unrest, the dissatisfaction at Puhi Camp was minimal. Grove Farm management sought to maintain a stable workforce by providing attractive living and working conditions. Other plantation managers often criticized George Wilcox:

> He supplied wood for the workers' cooking stoves and kerosene for their lamps. Broadbent invented a wood cutter and splitter so the workers didn't have to make their own kindling. Other plantation managers made the usual complaint, "you're spoiling your men!" (Krauss and Alexander 1984:310)

By 1930, Puhi Camp housed up to 1,200 workers and their families in approximately 600 homes (Kamai et al. 2016). These homes were significantly improved when compared to the earlier living conditions. They were equipped with running water, concrete-floor kitchens, individual bedrooms, and a garden plot (Krauss and Alexander 1984, Riznik 1999)(Figure 33). In addition to improved housing, Puhi Camp offered shared amenities such as a playground, movie theater, meeting hall, stores, laundry, and recreational spaces. Childs observed that "no organized effort is being made in the way of recreation and amusement, excepting at Puhi Camp" (Riznik 1999:137). Figure 34 through Figure 35 show Puhi Camp and the surrounding sugarcane fields in 1950, 1960, and 1965, respectively. Better living conditions and carefully planned social environments, like those from Puhi Camp, were used to stabilize the labor force, promote health, and encourage worker loyalty (Riznik 1999). In the 1970s, Grove Farm converted former sugarcane fields to fee simple house and lot packages that were available for purchase to employees. Grove Farm was the first plantation in Hawaiʻi to allow employees to buy their own homes (Grove Farm 2025) (Figure 36). During the construction of Kauaʻi Community College during the 1970s, Puhi Camp was partially destroyed (Figure 37). The remaining portions of the former plantation camp were fully cleared during the 1980s.

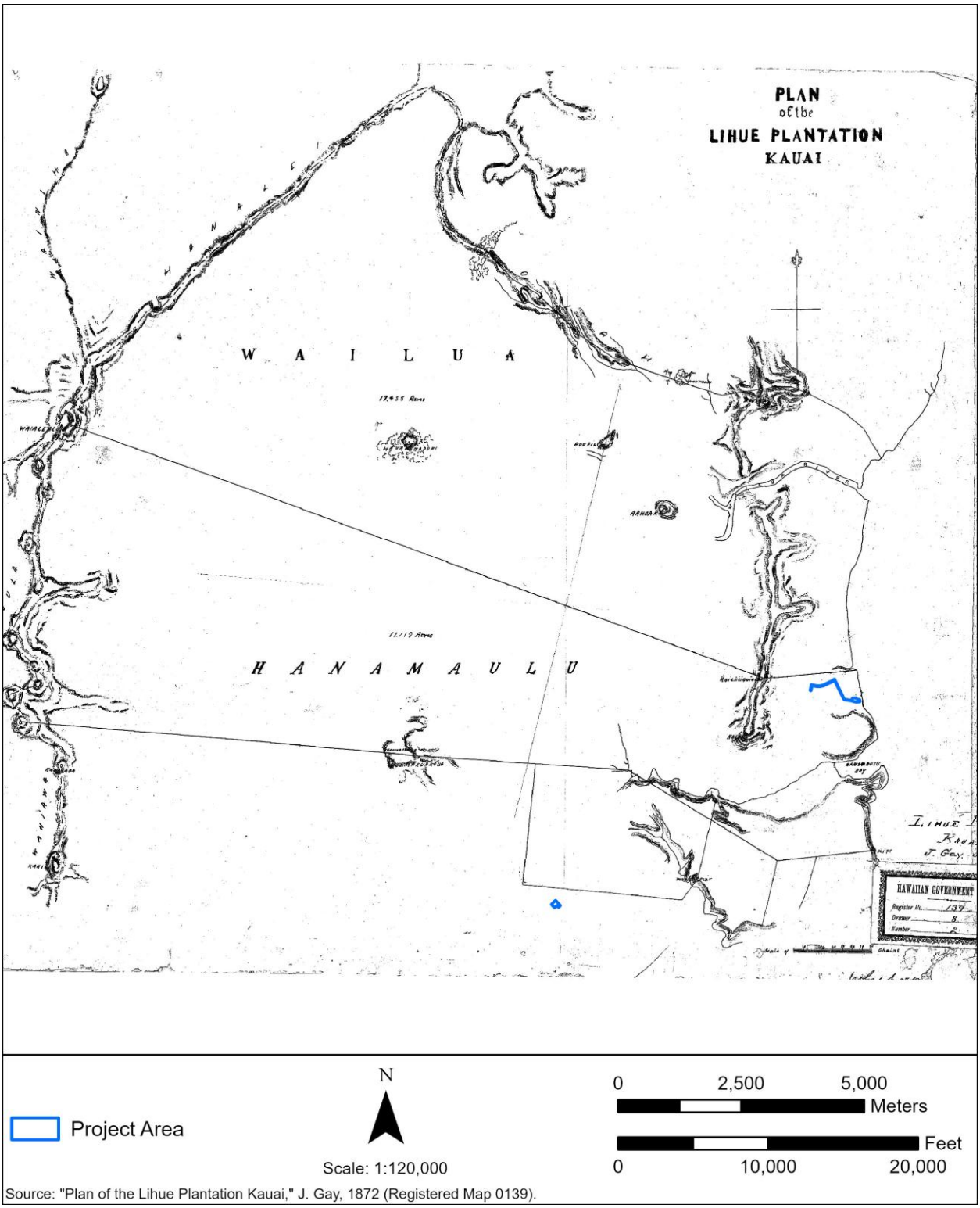


Figure 28. An 1872 J. Gay map depicting Lihue Plantation's lands in Wailua and Hanamāʻulu Ahupuaʻa.



Figure 29. An 1878 Government Survey map depicting Lihue Plantation (red arrow) and Grove Farm (orange arrow) sugarcane fields in the area of present-day Līhuʻe Town. Note the present-day Kaumualiʻi Highway depicted here as an unimproved road.

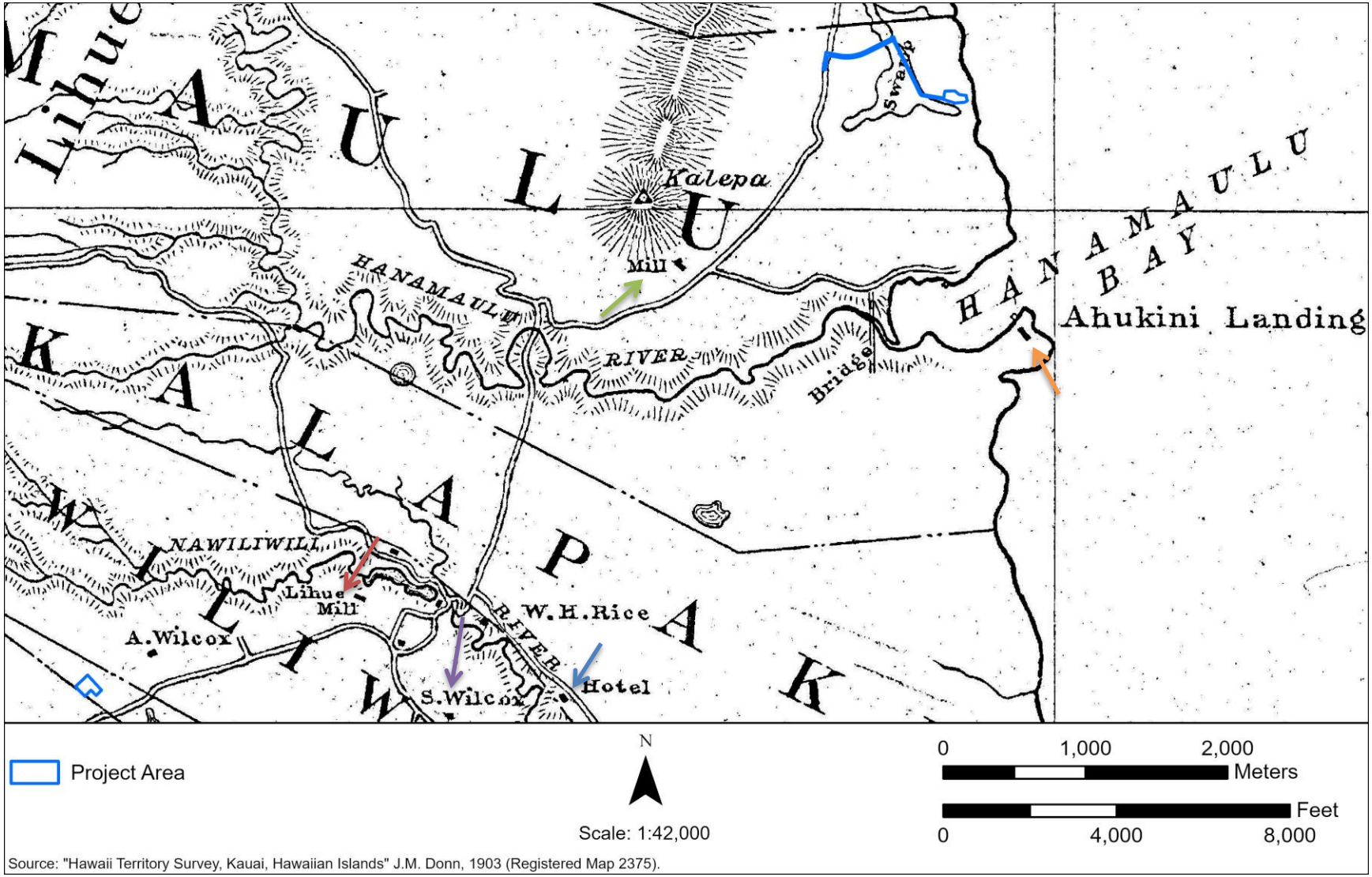


Figure 30. A 1903 Donn Hawaii Territory Survey map depicting a swamp at Nukoli'i, a sugar mill (likely Hanamā'ulu Mill; green arrow) at the base of Kālepa, Lihue Mill in Nāwiliwili (red arrow), Ahukini (orange arrow) [Fairview] Hotel (blue arrow), and the S. Wilcox residence (the site of the future Grove Farm Museum; purple arrow).

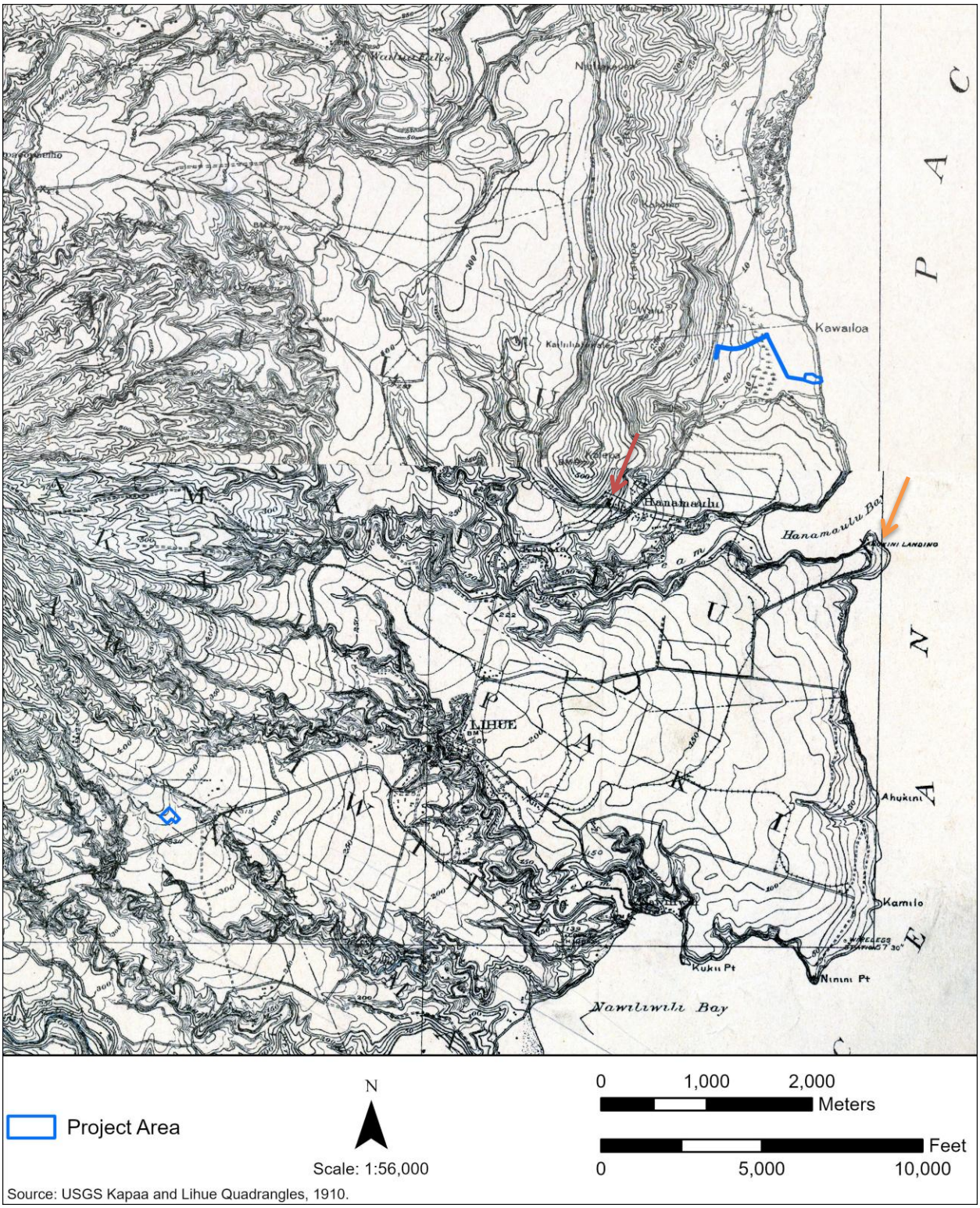


Figure 31. A 1910 USGS map depicting Hanamāʻulu Sugar Mill (red arrow) at the base of Kālepa and Ahukini (orange arrow). Note the railroad tracks connecting the two.



Figure 32. A 1928 photograph of Puhi Camp (Grove Farm 2025).

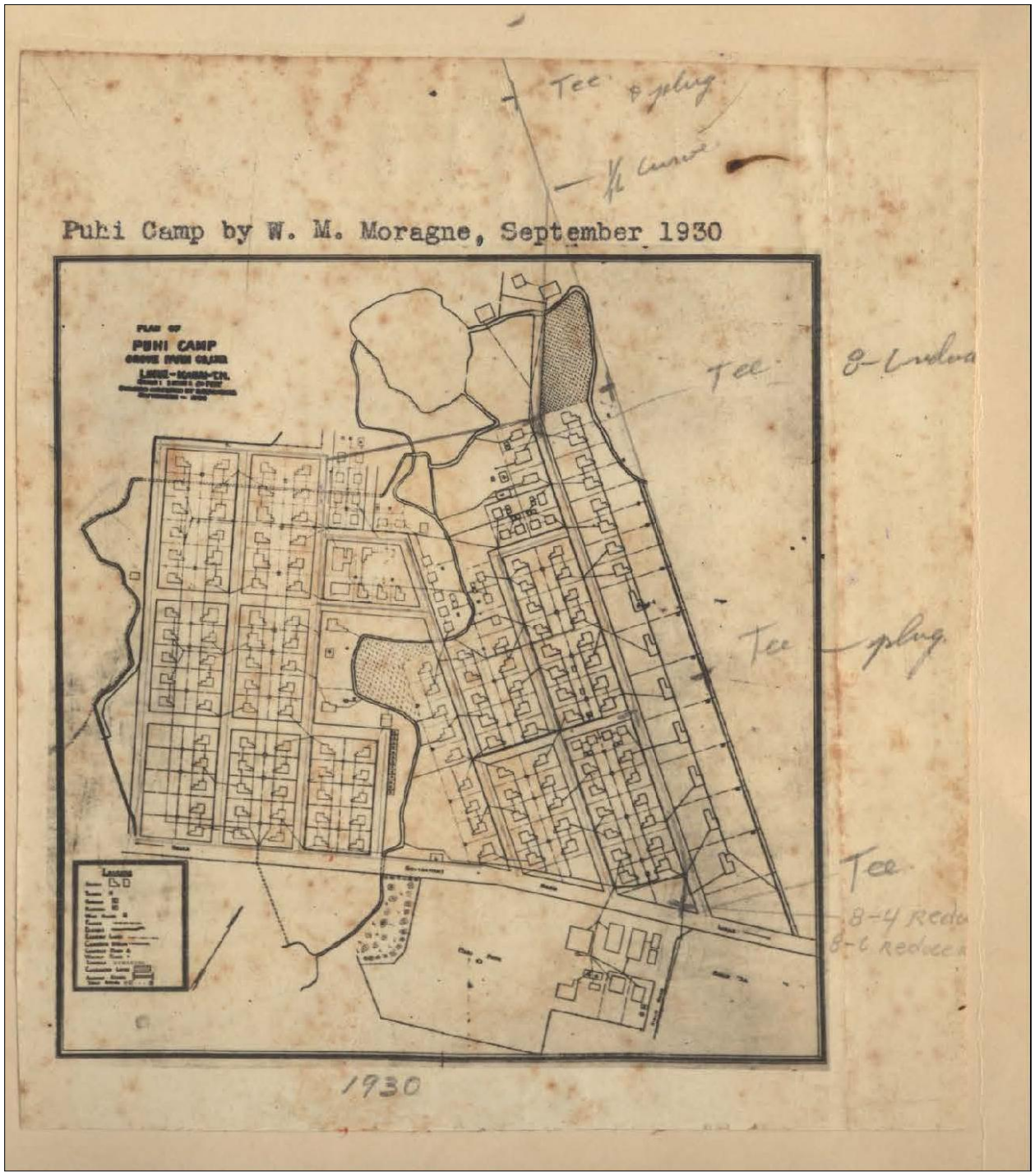


Figure 33. A 1930 map of Puhi Camp by W.M. Moragne (Grove Farm 2025).



Figure 34. A 1950 USGS aerial photograph of the Kauaʻi Community College portion of the HIFL project area, showing a developed Puhi Camp and sugarcane fields.

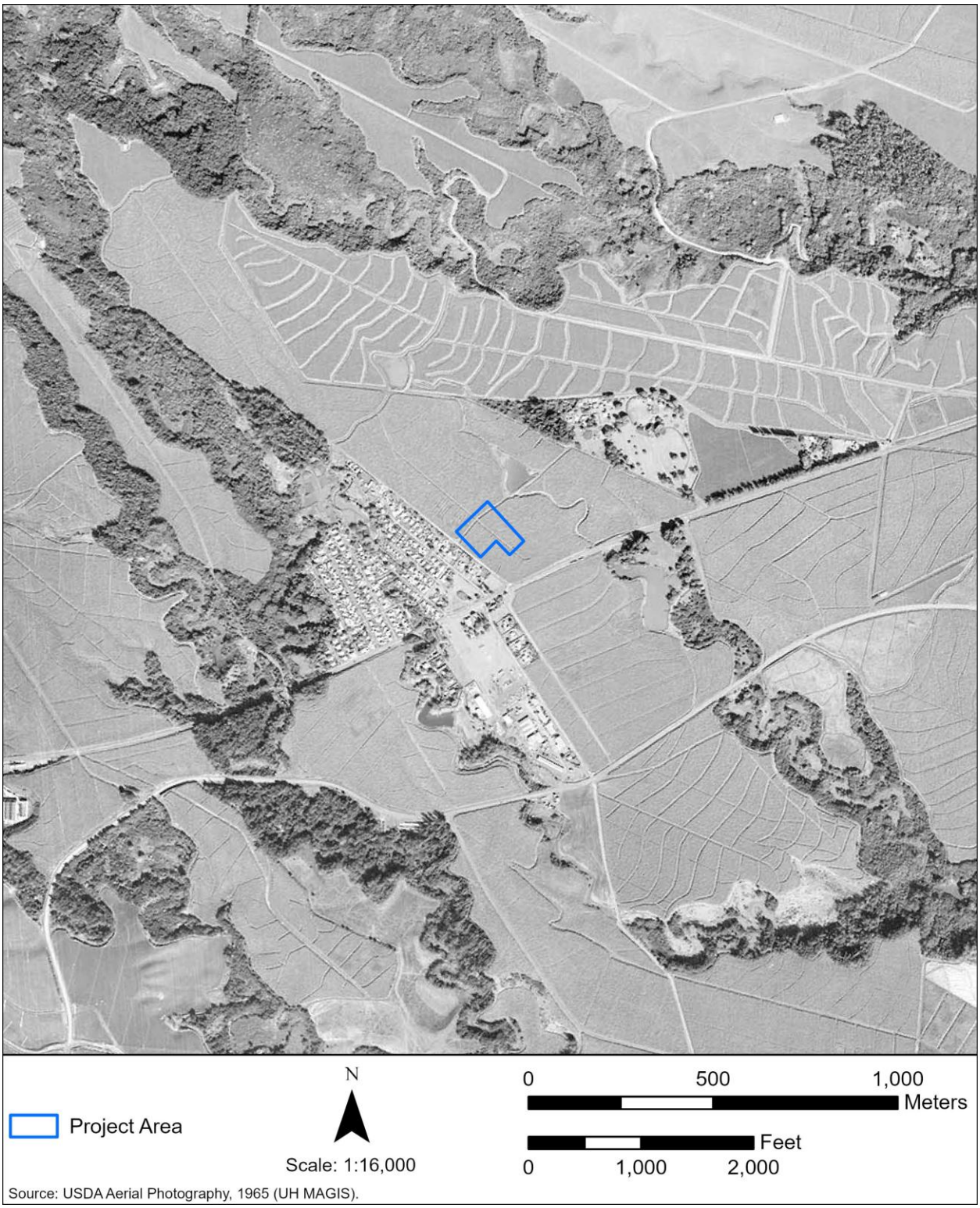


Figure 35. A 1965 USGS aerial photograph of the Kauaʻi Community College portion of the HIFL project area, showing a developed Puhi Camp and sugarcane fields.

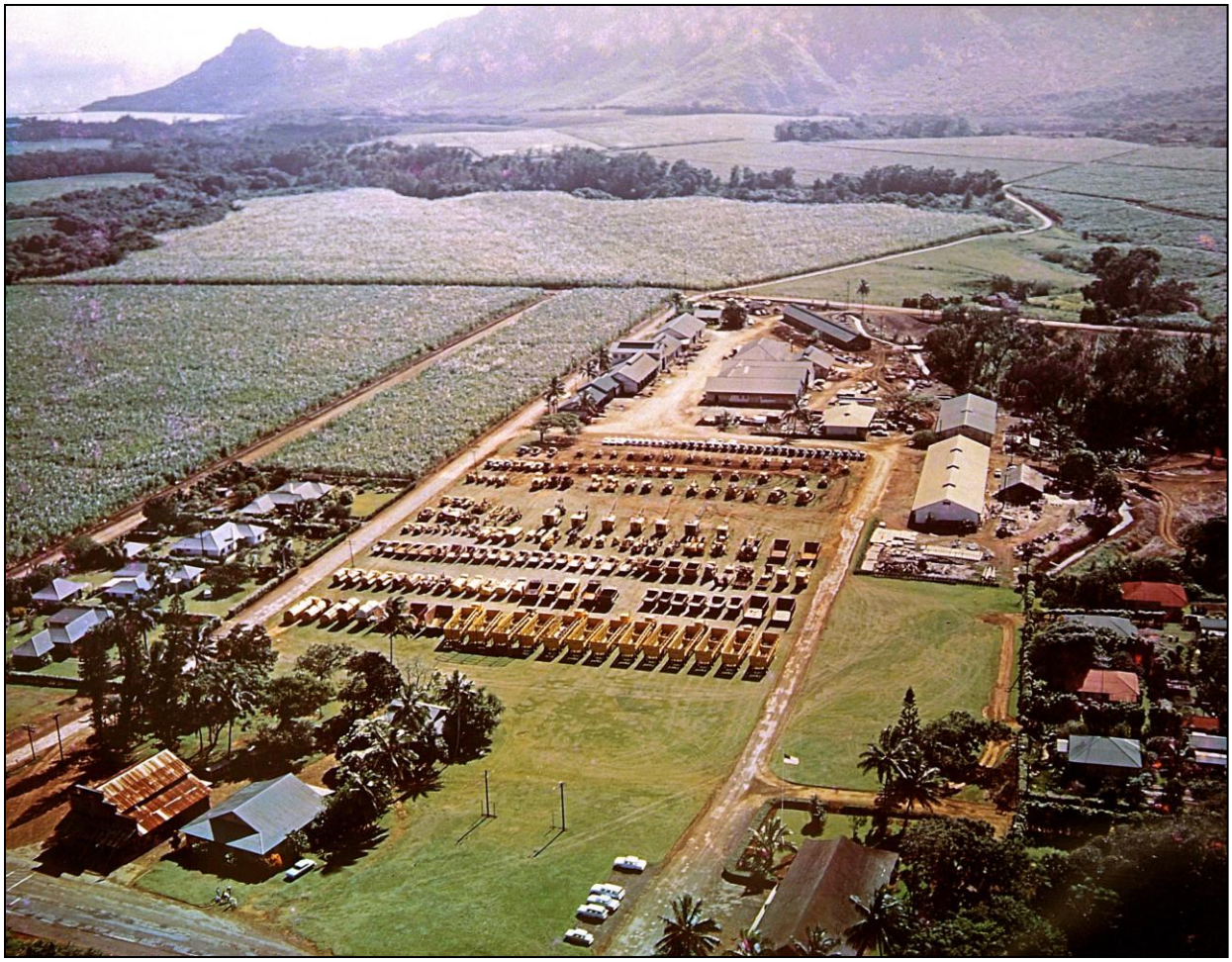


Figure 36. An aerial photograph of Puhi Camp in the 1970s, showing the camp and center of the plantation operations surrounded by sugarcane fields (Grove Farm 2025).



Figure 37. A 1978 USGS aerial photograph of the Kauaʻi Community College portion of the HIFL project area, showing the newly constructed campus and the demolition of some portions of Puhi Camp.

3.1.8 20th Century Developments

While the areas between the Kauaʻi Community College portion of the HIFL project area and the Nukoliʻi Beach portion had been transformed by plantation agricultural use, at the turn of the twentieth century, the area surrounding the Nukoliʻi Beach portion of the HIFL project area was still largely undeveloped. An aerial photograph from 1929 shows the Nukolii Dairy Farm (also known as Lihue Dairy and Hanamaulu Dairy), just south of this portion of the project area (Figure 38) (Bushnell et al. 2004:59). In the 1920s there were 34 dairy farms operating on Kauaʻi. The Nukolii Dairy maintained 24 cows and sold 213 quarts of milk per day (Moriki 2014). During the 1930s, the Nukolii Dairy field was used for emergency landing of aircrafts and the area to the north, where the present-day Wailua Golf Course is located, was used as a commercial airstrip (U.S. Navy Hydrographic Office 1935:231) (Figure 39). By 1940s, the airstrip was no longer present, and a horse racetrack had been built in the area (Figure 40) (Bushnell et al. 2004:59). The recreational area also included baseball and volleyball courts (Soboleski 2018). In 1947, the thirteenth annual Kauaʻi County Fair was held in the new park (Soboleski 2018). Around the same time, Nukolii Dairy farmlands had extended to the northern fields where the present-day Nukoliʻi Beach Park and Outrigger Kauaʻi Beach Resort & Spa is located (Figure 40, Figure 41). The area remained relatively unchanged for the next decade or so (Figure 42). The Nukolii Dairy ceased operations in the late 1960s (Bushnell et al. 2004:59).

Military Developments

Following the December 7, 1941 Japanese attack on Pearl Harbor, Kauaʻi, like Oʻahu, became a strategic site for U.S. military defense. On December 15, 1941, a Japanese submarine surfaced in the Nāwiliwili Harbor and shelled the shoreline with no reported damage. The submarine struck again on the 30th and 31st of December but caused only a little damage to the harbor. At the time, it was thought that Kauaʻi and Oʻahu would be the most likely targets for a ground assault, and an entire battalion of military personnel were deployed to Kauaʻi in the spring of 1942. The enlisted men were assisted by the Kauai Volunteers, three battalions of about 2,200 citizens, under Paul Townsley, an official from Lihue Plantation. The volunteers were supplied with rifles and munitions by the U.S. Army. The volunteers, mostly Filipino sugar-laborers, were instructed to man the 150 pillboxes around Kauaʻi's coastline for beach defense (Bennett 2003:66-70). During World War II, acreages of Grove Farm were used to grow food for the military and the local population. Portions of Grove Farm were designated as the Grove Farm Artillery Impact Area, which bordered one of several military jungle training areas on Kauaʻi (Kamai et al. 2016:27). A 1963 USGS map depicts "Kawai" north and south bases in Niumalu Ahupuaʻa, near the Kauaʻi Community College portion of the HIFL project area (Figure 43). A U.S. Marine Corps camp was also located in Nukoliʻi during World War II. Although its precise location is unknown, sources place it in the northern part of the general area of Nukolii Dairy, which in the early twentieth century extended from the location of the present-day Outrigger Kauaʻi Beach Resort & Spa to the south of the Nukoliʻi Beach access (Cooper and Daws 1985:326 as cited in Bushnell et al. 2004; visible in Figure 40).

Nukoliʻi Resort Development

The Nukoliʻi Beach area, like many others across the Hawaiian Islands, has been the subject of a battle against development. In the 1970s, the Pacific Standard Life Insurance Company of Los Angeles acquired the Hanamāʻulu Beach Resort property (Turner 1981)(see Figure 43). In 1974,

the State Land Use Commission quietly reclassified the land from agricultural to urban, and within months, investors sold the land for 400% profit (Evslin 2016). Still, construction was not able to start until the county changed the zoning to resort. In 1978 (Figure 44, Figure 45), the Planning Department recommended the zoning change, despite growing local opposition and protests. The County Council voted to approve the zoning change.

Community members, organized under the Save Nukoli'i Committee, successfully pushed for a county-wide vote (Evslin 2016). In 1980, 5,000 signatures were gathered for a referendum vote that overturned the zoning ruling; however, developers had already secured building permits the day before the election, and therefore, construction was able to begin (Turner 1981, Evslin 2016). The Committee asked for the Circuit Court of Kaua'i County for a ruling. Judge Kei Hirano sided with developers and argued that they had the right to continue with the project since they had already started construction (Turner 1981). This decision sparked outrage and deepened community divisions. Protests led to dozens of arrests, and tensions eventually escalated into violence when two government offices were bombed (Evslin 2016).

Although the Hawaii Supreme Court later overturned the circuit court's ruling and revoked the building permits, the project was already partially built, and millions of dollars were already invested (Evslin 2016, TenBruggencate 1982). Facing economic recession and damage from Hurricane Iwa, public opinion began to shift. In 1984, a second referendum, funded by the developers, reversed the earlier vote and allowed construction to resume (Evslin 2016). The first structures of the resort are depicted on a 1983 USGS map (Figure 46).

The completed resort, known until recently as the Nukoli'i Beach Resort, stands as a reminder of the island's shift toward a resort-based economy. As Evslin (2016) noted decades later, Kaua'i now faces a dual crisis: too many tourists for its infrastructure to support, and too few affordable homes for local families being built. Today, the hotel is known as the Outrigger Kaua'i Beach Resort & Spa, held by the Outrigger Hospitality Group, with holdings in the Asia Pacific region and Indian Ocean. A 1996 USGS map and a 2000 USGS aerial photograph show the complete resort just north of the Nukoli'i Beach portion of the HIFL project area (Figure 47, Figure 48).

Kaua'i Community College

Kaua'i Community College is one of 10 campuses within the UH system and is the only institution of higher learning on the island of Kaua'i. The college offers 34 degree and certificate programs, as well as non-credit courses (Kaua'i Community College 2025). As of fall semester 2024, 1,335 students were enrolled at Kaua'i Community College; 80.7% of these students are enrolled part-time (University of Hawai'i 2025).

In 1972, Sam Wilcox, descendant of George N. Wilcox, donated 200 acres of Grove Farm's prime cane land to UH to build Kaua'i Community College. Grove Farm stockholders objected, but Sam insisted that the location of the college would draw development into the area, which would benefit Grove Farm (Krauss and Alexander 1984:413). Figure 44 depicts southeastern Kaua'i—which was undergoing increased urbanization and development—in 1978, six years after the donation of the land to build Kaua'i Community College.

Puhi Camp was partially destroyed during the construction of the college in the 1970s (see Figure 37, and compare to Figure 34 through Figure 35). The remaining portions of the former plantation

camp were fully cleared during the 1980s. Since then, aside from periodic upgrades to Kauaʻi Community College, little development has occurred in the surrounding area, north of Kaumualiʻi Highway (DiVito et al. 2021).

In 1989, American Factors, Inc. (AMFAC) donated 10 acres of land just north of Kauaʻi Community College for the establishment of Island School. The new Puhi campus opened in September 1991 with an initial enrollment of 123 students in kindergarten through 12th grade (Island School 2025). In 2000, Island School acquired an additional 20 acres for expansion, half of which was developed into soccer fields and a grass track. Since then, the school has graduated over 500 students, most of whom have gone on to attend four-year colleges (Island School 2025). Figure 44 through Figure 47 depict development in the whole of southeast Kauaʻi between 1978 and 1996.



Figure 38. A ca. 1930s photograph of the Nukolii Dairy (red arrow), also known as the Lihue Plantation Dairy, at Nukoli'i Beach (National Archives and Records Administration).

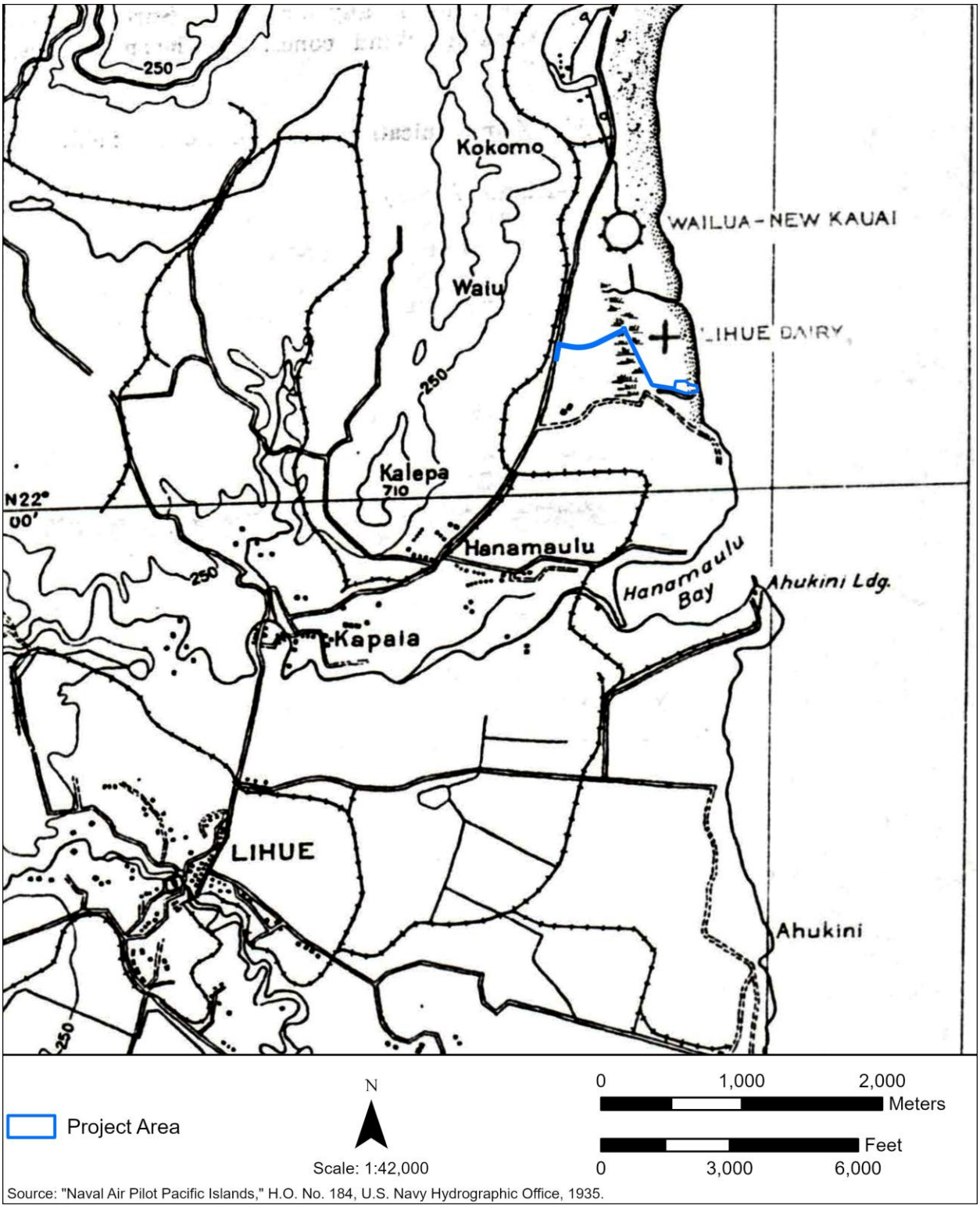


Figure 39. A U.S. Navy map published in 1935, depicting the emergency landing airfield at Lihue Dairy and an airfield in the location of the present-day Wailua Golf Course.



Figure 40. A 1941 aerial photograph of the "Lihue Dairy Field" showing the Nukolii Dairy (blue arrow), horse racetrack (orange), present-day Nukoli'i Beach Park access (red arrow), the general area of the present-day Outrigger Kaua'i Beach Resort & Spa (pink arrow), and what is likely the U.S. Marine Corps camp (green arrow) (National Archives and Records Management).



Figure 41. A 1950 USGS aerial photograph of the Nukoli'i Beach portion of the HIFL project area. Note the Nukolii Dairy farmlands, which have extended into the northern fields, where the present-day Nukoli'i Beach Park and Outrigger Kaua'i Beach Resort & Spa are located.



Figure 42. A 1959 USGS aerial photograph of the Nukoli'i Beach portion of the HIFL project area. Note that the area is relatively unchanged from the 1950 aerial image (Figure 41).



Figure 43. A 1963 USGS map showing development across southeastern Kaua'i. Note the Nukolii Dairy (blue arrow) and Puhi Camp and associated cemetery (purple arrow).

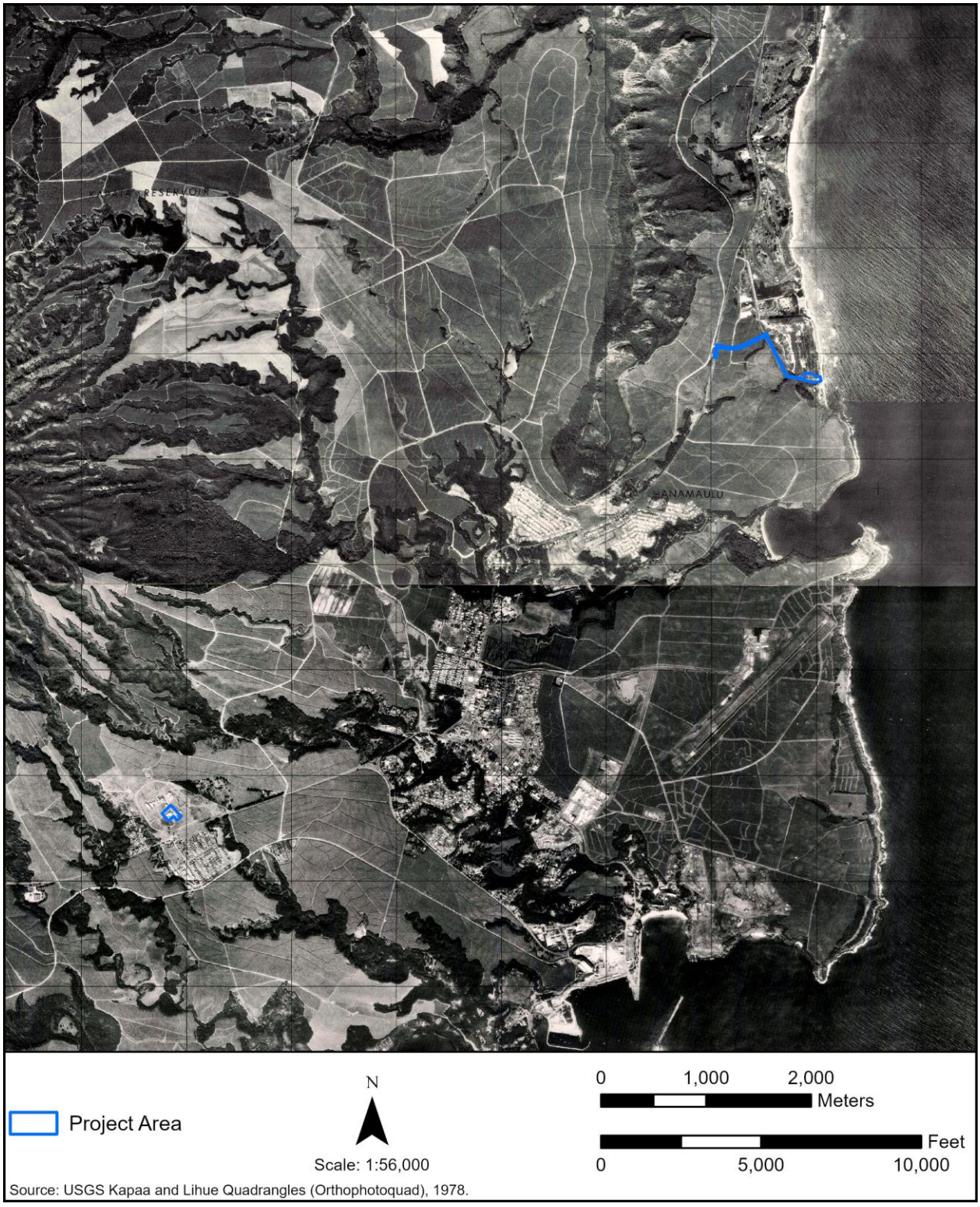


Figure 44. A 1978 USGS orthophoto of southeastern Kauaʻi. Note the development in the vicinity of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College, as well as the urbanization of Līhuʻe Town.



Figure 45. A 1978 USGS aerial photograph of the Nukoli'i Beach portion of the HIFL project area.



Figure 46. A 1983 USGS map depicting urban development in the vicinity of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College, as well as Līhuʻe Town.



Figure 47. A 1996 USGS map depicting further development in the vicinity of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College, as well as Līhuʻe Town. Note the expansion of the present-day Outrigger Kauaʻi Beach Resort & Spa (red arrow) and Island School and the Kauaʻi Community College campus (orange arrow).



Figure 48. A 2000 USGS aerial photograph of the Nukoli'i Beach portion of the HIFL project area. Note the completed present-day Outrigger Kaua'i Beach Resort & Spa to the north of the project area.

3.1.9 Previous Consultation for Nearby Projects in Hanamāʻulu and Niumalu Ahupuaʻa

The knowledge shared in previous CIAs for projects within Hanamāʻulu and Niumalu Ahupuaʻa may provide insights into valued cultural resources and the exercising of Native Hawaiian rights in these areas. Although previous studies were specifically tailored to assess the impacts of projects that differ from the current one, they may include information that is generally relevant.

Participants in a CIA for the proposed Ocean Bay Plantation at Hanamaʻulu Bay (PHRI 2001) spoke about the collection of shoreline marine resources, including *haʻukeʻuke* (sea urchins), *ʻopihi* (limpets; *Cellana exarata*), and *limu* (seaweed), including *limu kohu* (*Asparagopsis taxiformis*) and *limu wawaeʻiole* (*Codium edule*). The collection of other shoreline resources, including *pili* grass (*Heteropogon contortu*s) and wild spinach (*Chenopodium album*) was also discussed. They also shared that various forms of fishing were practiced, including bottom fishing, diving and spearfishing, throw net fishing, *kilo* (spotting) for *akule* (*Sela crumenophthalmus*) in Hanamaʻulu Bay, fishing on the reef for *āholehole* (*Kuhlia marginata*)*, manini* (*Acanthurus triostegus*), and other species, and catching *akule, halalu* (*Trachurops crumenophthalma*)*, ʻopelu* (*Decapterus macarellus*)*, moi* (*Polydactylus sexfilis*)*, and ʻamaʻama* (*Mugil cephalus*). Participants also discussed catching lobster and *heʻe* (octopus; *Octopus cyanea*)*,* catching *ʻoʻopu* (Hawaiian freshwater goby; *Lentipes concolor*) from the stream, and crabbing. The use of the shoreline for burial practices was also discussed. Valued fishing and gathering practices, along with the potential for encountering burials along the sandy shoreline was also discussed by participants of a 2004 CIA for the Kapaʻa Relief Route extending from Kapaʻa to Hanamāʻulu (Bushnell et al. 2004).

Kanahele et al.'s (2007) study for the Lihuʻe Airport Improvements Project was focused on a large area between Hanamāʻulu Bay to the north and Haupu mountain to the south, and included both Hanamaʻulu and Niumalu Ahupuaʻa, along with Kipukai, Kupuuka, Huleʻia, ʻAlekoko, Nawiliwili, Haʻikū, and Kalapaki. They identified numerous *heiau* and *koʻa* in the area and valued resources such as seasonal *kaunaʻoa* (*Cuscuta sandwichiana*) gathered at Ninini Point for lei making. Participants in Kanahele et al.'s CIA emphasized fishing practices, especially at ʻAhukini Landing in Hanamaʻulu Bay.

CIAs have also been completed for projects at Kauaʻi Community College (Hammatt and Shideler 2004; Faʻanunu et al. 2012). Hammatt and Shideler (2004) concluded that it was unlikely that there would be cultural impacts resulting from the building of a "One Stop Center" on campus. Faʻanunu et al.'s (2012) CIA for the redesignation of Kauaʻi Community College to an urban district identified significant streams and watersheds near and downstream from the project area, and CIA participants related that the gathering of plants such as bamboo shoots, mangoes, papaya, guava, passionfruit, and *pepeiao* (cloud ear fungus; *Auricularia sp.*) and the catching of crayfish, *ʻoʻopu*, and frogs in nearby irrigation ditches and reservoirs was an important practice, along with boar and pheasant hunting nearby. CIA participants stressed the importance of the ecological relationship that shapes cultural and natural resources, and a need to maintain ecological balance by keeping contaminants from the watershed to ensure that downstream areas were not adversely impacted. They also expressed concern regarding potential impacts to nearby historic cemeteries associated with Puhi Camp should the college campus be expanded.

3.1.10 Previous Archaeology

A total of 21 archaeological studies have been conducted within 0.5 miles (0.8 km) of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College, resulting in the identification of 11 historic properties. Archaeological investigations specific to the Nukoliʻi Beach portion of the HIFL project area are presented in Table 5 and Figure 49, and those specific to the Kauaʻi Community College portion of the HIFL project area are shown in Table 6 and Figure 50. Collectively, Table 3 and Table 4 provide an overview of all 21 archaeological investigations with a summary of their findings, including functional site types, excavation results, and radiocarbon analysis, if relevant. All previously identified historic properties within the 0.5-mile buffer are described in Table 5 (Nukoliʻi Beach portion) and Table 6 (Kauaʻi Community College portion), which also contains significance assessments and mitigation recommendations. These historic properties are presented on Figure 51 (Nukoliʻi Beach portion) and Figure 52 (Kauaʻi Community College portion).

Nukoliʻi Beach

A total of five historic properties reflecting both pre- and post-Contact activities have been identified within 0.5 miles of the Nukoliʻi Beach portion of the HIFL project area. Pre-Contact historic properties include a habitation complex with two cultural deposit features (SIHP 50-30-08-01838), as well as a reinterment area for inadvertently discovered *iwi kūpuna* within the southeastern portion of the project area, closest to the beach. A portion of a larger burial complex (SIHP 50-30-08-00103) consisting of 44 burials and 42 isolated finds from previously disturbed burials is located north of the project area. The burials and isolated finds recorded as SIHP -00103 were reinterred at a protected location within Wailua Golf Course. Post-Contact historic properties include a drainage canal that crosses the northern portion of the project area (SIHP 50-30-08-02235), a concrete bridge (SIHP 50-30-08-01846), and an irrigation ditch (SIHP 50-30-08-00885) associated with the sugar plantation industry.

Two historic properties have been documented within the current project area: SIHP 50-30-08-02235 and SIHP 50-30-08-01838. SIHP 50-30-08-01838 is a pre-Contact habitation complex with two subsurface cultural deposit features (Feature A and Feature B), located in the southeastern portion of the project area, closest to the beach, and extending past the boundary of the project area. SIHP -01838 was initially identified by Walker et al. (1991) and subsequently reidentified by Corbin et al. (2002). Corbin et al. identified Feature A as a cultural deposit, "exposed in a cut sand bank," which was "composed of charcoal-stained sand and contained sparse shell midden" (2002:25). Similarly, Feature B was identified as a cultural deposit exposed "on the surface of a sand dune," which was "composed of charcoal-stained sand and contained sparse marine shell" (2002:26). Corbin et al. (2002) assessed SIHP -01838 as significant under Criteria a and d and recommended preservation "as is" (PAI). The historic property also contains a reinterment area for inadvertently discovered *iwi kūpuna* identified within Nukoliʻi Beach Park. The burials were reinterred at a protected location within the project area (On File, SHPD).

SIHP 50-30-08-02235 is a post-Contact ditch (Soltz et al. 2014) that runs along the *mauka* side of Kauai Beach Road, crossing the project area to the north. Soltz et al. (2014) provided the following description of SIHP 50-30-08-02235:

> SIHP # 50-30-08-2235 consists of a section of a drainage ditch in the northern portion of Hanamaʻulu Ahupuaʻa. The ditch is oriented NW/SE roughly paralleling the coast. It extends along the makai (seaward) edge of a former swamp (now filled-in) located about 500 m inland of the coast, as shown on the 1910 USGS Topographical map … Although outside the project area, the top of the eastern bank of the ditch is in close proximity, approximately 2.0 m west of the project boundary. The extent of SIHP # -2235 adjacent to the project area includes only a section within Hanamaʻulu Ahupuaʻa, which connects two natural drainages that once originated in the swamp. There is no evident earth berm surrounding the ditch and no stonework…
>
> SIHP # -2235 ditch in Hanamaʻulu ahupuaʻa is approximately 635 m long. From its southern end, the ditch proceeds north from a natural drainage … that originated from the swamp to the west and extended to the sea. The ditch proceeds northerly to the boundary of Hanamaʻulu and Wailua passing to the west side of the project area and a sewage treatment plant on the northwest comer of the Kauaʻi Beach Resort … Beyond the project area to the north and beyond the north boundary of Hanamaʻulu ahupuaʻa the ditch splits … with one channel continuing in a northerly direction and another forming a T (perpendicular intersection) proceeding in an easterly direction to the sea. This second ditch, oriented generally east-west extends in a straight line from north of the sewage treatment plant to the coast at Kawailoa (also called Nukoliʻi) Beach, as shown on a 1963 USGS map … This second ditch does not follow a natural drainage, however it is close to the alignment of an old stream that drained the northern end of the inland swamp. The ditch terminates at the mouth of this old stream…
>
> The drainage ditch does not appear on a 1910 U.S.G.S. map (see Figure 12), nor on a 1941 Lihue Plantation map … The alignment of the ditch does follow the alignment of the Ahukini Terminal & Railway Co. (AT&R) railroad track, built in 1921, which connected several sugar plantations north of the project area to Ahukini Landing on the south side of Hanamaʻulu Bay (Conde and Best 1973:185) … In 1959, most sugar plantations had switched to hauling the sugar cane by truck rather than by train, so this section of the old AT&R track would have been abandoned by this time, if not earlier (Conde and Best 1973:168). No evidence of the old track or rail bed was observed in the vicinity of the project area. The drainage ditch does appear on a 1963 U.S. topographic … and all subsequent maps. From the historic maps, it is evident that this ditch was built sometime between 1941 and 1963 and probably after the abandonment of the railroad in 1959. The ditch is within TMK 3-7-003:017… (Soltz et al. 2014:57-58).

Soltz et al. (2014) assessed SIHP -02235 as significant under Criterion d. The project-specific effect recommendation was "no historic properties affected, with proposed mitigation commitments," consisting of the placement of temporary fencing or a barricade between the bank and the ditch, which was advised to prevent construction debris from falling in. No further archaeological work was recommended (Soltz et al. 2014:60-61).

Pacific Legacy conducted a literature review and field inspection (LRFI) for the HIFL project (Mulrooney et al. 2025). Two potential historic property features were identified during the field inspection in the Nukoliʻi Beach portion of the project area. These included a concrete jetty off the Nukoliʻi Beach shoreline, and a water control feature consisting of a metal drainage gate and small drainage ditch.

Kauaʻi Community College

Six historic properties have been identified within 0.5 miles of the portion of the project area located at Kauaʻi Community College. Most of these are associated with plantation-era infrastructure and post-Contact activities reflecting a variety of functions, including agriculture, habitation, burial, transportation, and refuse disposal. These features include irrigation and water control infrastructure from the Līhuʻe Plantation (SIHP 50-30-11-02179), a cemetery associated with Grove Farm's Puhi Camp (SIHP 50-30-11-B006), a subsurface trash deposit linked to plantation-era occupation (SIHP 50-30-11-02307), a historic residence (Kilohana/Gaylord P. Wilcox House; SIHP 50-30-11-09339), Grove Farm Company Locomotives (SIHP 50-30-11-09381), and Grove Farm office building (No SIHP). No historic properties have previously been identified within the Kauaʻi Community College portion of the HIFL project area.

During Pacific Legacy's LRFI for the HIFL project, no potential historic properties were identified within the portion of the HIFL project area at Kauaʻi Community College.

Table 3. Previous Archaeological Studies within 0.5 Miles of the Nukoli'i Beach Portion of the HIFL Project Area

Reference	Type of Study	Findings
Bennett 1931	Island-Wide Survey	Identified one historic property within 0.5 miles of the current project area: a dune burial site (later assigned SIHP 50-30-08-00103). No significance assessment or recommendations were made.
Walker et al. 1991	Archaeological Inventory Survey	Identified 10 historic properties, two of which are located within 0.5 miles of the current project area: SIHP 50-30-08-01838, a pre-Contact habitation complex with two features, a mound that was possibly displaced by bulldozing activity, and a sandy surface containing marine midden within the Nukoli'i Beach portion of the project area; SIHP 50-30-08-01846 includes two post-Contact bridges associated with railroad use, constructed over and between two drainage ditches. Both SIHP -01838 and -01846 were assessed as significant under PHRI category A (important for information content) and recommended for further data collection (FDC). Additionally, SIHP -01838 received a provisional assessment for PHRI significance category C (culturally significant) and was recommended for preservation "as is" (PAI).
Fager and Spear 2000	Archaeological Monitoring	Documented one previously documented historic property (SIHP -00103, a dune burial site) that is partially within 0.5 miles of the current project area. SIHP -00103 consists of 44 burials and 42 isolated finds from previously disturbed burials likely associated with the pre-Contact period. Only three burials were identified *in situ.* SIHP -00103 was assessed significant under Criteria d and e and all recovered burials and isolated finds were reinterred at a protected location within Wailua Golf Course.
Corbin et al. 2002	Archaeological Inventory Survey	Documented 10 previously identified historic properties, one of which, SIHP -01838 is within the current project area, and one of which, -01846, are located within 0.5 miles of the current project area. Both sites were assessed significant under Criteria a and d and recommended for preservation "as is" (PAI).
Dega and Powell 2003	Archaeological Monitoring	Documented 10 previously identified historic properties, one of which, SIHP 50-30-08-00885, is located within 0.5 miles of the current project area. This site consists of a partial irrigation ditch tunnel associated with the sugar plantation industry. It was assessed as significant under Criterion d and recommended for no further work.
Mason Architects, Inc. 2003	Historic Resources Survey, Evaluation, and Impact Assessment	Identified 38 historic buildings considered potentially eligible for the National Register, none of which are within 0.5 miles of the current project area.
Yorck et al. 2004	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Soltz et al. 2014	Archaeological Inventory Survey	Identified one historic property, a portion of which is within the current project area. SIHP 50-30-08-02235 is a post-Contact drainage canal. The site has been recommended for inclusion on both the National and the Hawai'i Register of Historic Places and is assessed as significant under Criterion d. No further work was recommended, and protective measures were suggested to prevent debris from entering the canal during construction activities.

Note: Previous studies that include the current project area are highlighted in gray.

Reference	Type of Study	Findings
Bennett 1931	Island-Wide Survey	Identified one historic property within 0.5 miles of the current project area: a dune burial site (later assigned SIHP 50-30-08-00103). No significance assessment or recommendations were made.
Walker et al. 1991	Archaeological Inventory Survey	Identified 10 historic properties, two of which are located within 0.5 miles of the current project area: SIHP 50-30-08-01838, a pre-Contact habitation complex with two features, a mound that was possibly displaced by bulldozing activity, and a sandy surface containing marine midden within the Nukoli'i Beach portion of the project area; SIHP 50-30-08-01846 includes two post-Contact bridges associated with railroad use, constructed over and between two drainage ditches. Both SIHP -01838 and -01846 were assessed as significant under PHRI category A (important for information content) and recommended for further data collection (FDC). Additionally, SIHP -01838 received a provisional assessment for PHRI significance category C (culturally significant) and was recommended for preservation "as is" (PAI).
Fager and Spear 2000	Archaeological Monitoring	Documented one previously documented historic property (SIHP -00103, a dune burial site) that is partially within 0.5 miles of the current project area. SIHP -00103 consists of 44 burials and 42 isolated finds from previously disturbed burials likely associated with the pre-Contact period. Only three burials were identified *in situ.* SIHP -00103 was assessed significant under Criteria d and e and all recovered burials and isolated finds were reinterred at a protected location within Wailua Golf Course.
Corbin et al. 2002	Archaeological Inventory Survey	Documented 10 previously identified historic properties, two of which, SIHP -01838 and -01846, are located within 0.5 miles of the current project area. Both sites were assessed significant under Criteria a and d and recommended for preservation "as is" (PAI).
Dega and Powell 2003	Archaeological Monitoring	Documented 10 previously identified historic properties, one of which, SIHP 50-30-08-00885, is located within 0.5 miles of the current project area. This site consists of a partial irrigation ditch tunnel associated with the sugar plantation industry. It was assessed as significant under Criterion d and recommended for no further work.
Mason Architects, Inc. 2003	Historic Resources Survey, Evaluation, and Impact Assessment	Identified 38 historic buildings considered potentially eligible for the National Register, none of which are within 0.5 miles of the current project area.
Yorck et al. 2004	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Soltz et al. 2014	Archaeological Inventory Survey	Identified one historic property, a portion of which is within the current project area. SIHP 50-30-08-02235 is a post-Contact drainage canal. The site has been recommended for inclusion on both the National and the Hawai'i Register of Historic Places and is assessed as significant under Criterion d. No further work was recommended, and protective measures were suggested to prevent debris from entering the canal during construction activities.

Note: Previous studies that include the current project area are highlighted in gray.

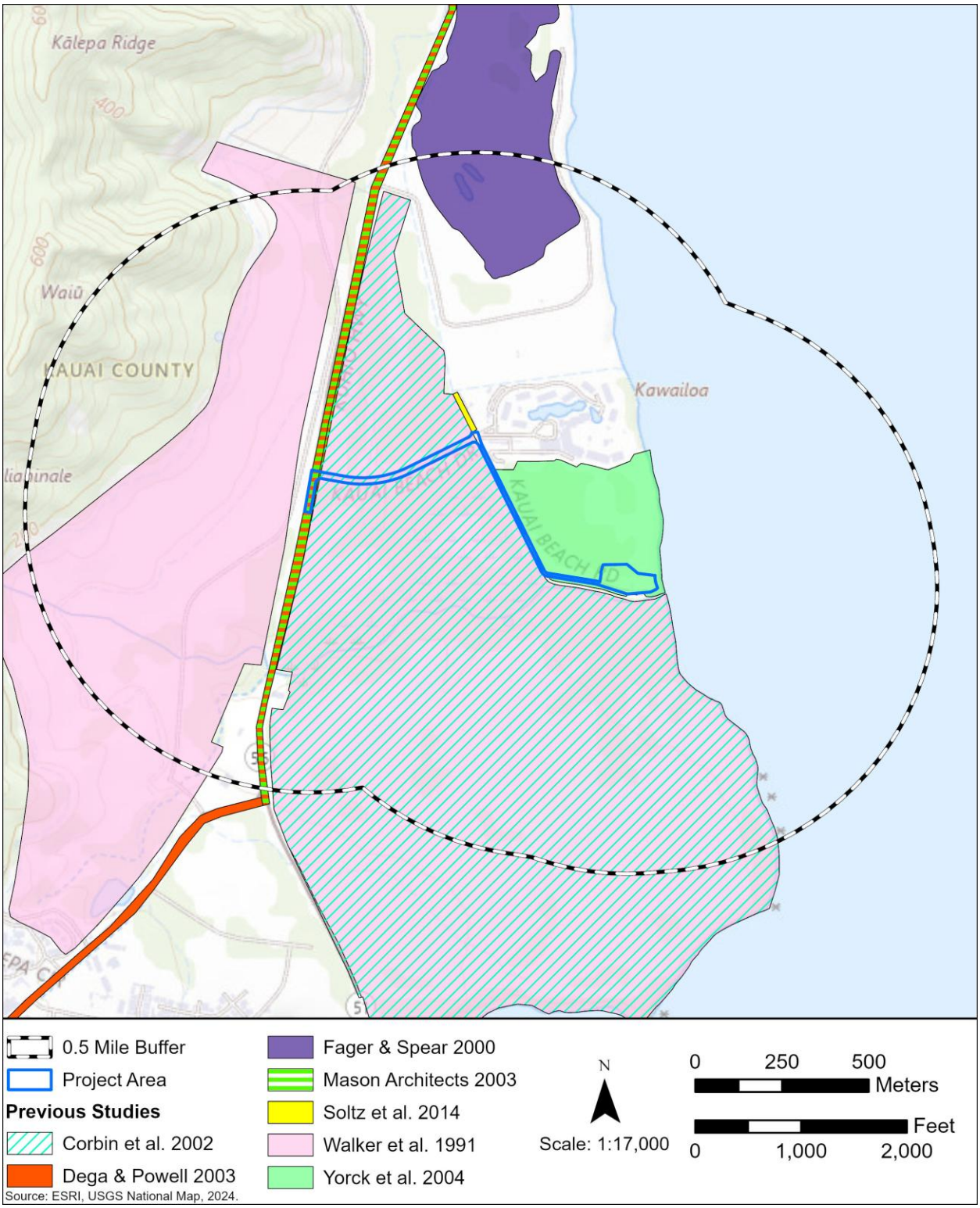


Figure 49. Previous archaeological studies conducted within 0.5 miles of the Nukoli'i Beach portion of the HIFL project area.

Table 4. Previous Archaeological Studies within 0.5 Miles of the Kauaʻi Community College Portion of the HIFL Project Area

Reference	Type of Study	Findings
Palama 1973	Archaeological Reconnaissance	Identified two old irrigation systems containing cement gates and overflows associated with the sugar cane industry, roads, tunnels and other features linked to the WWII era, a historic Japanese Cemetery (later designated as the Puhi Camp Cemetery and assigned SIHP 50-30-11-B006), remains of a plantation camp, and *loʻi*. No SIHP numbers or significance assessments assigned. No further work was recommended.
Walker and Rosendahl 1988	Interim Report	Identified two historic properties, neither of which are located within 0.5 miles of the current project area.
Rosendahl 1989	Archaeological Inventory Survey	No historic properties identified.
Walker et al. 1991	Archaeological Inventory Survey	Identified 10 historic properties, none of which are located within 0.5 miles of the current project area.
Kikuchi and Remoaldo 1992	Cemetery Study	Documented 1 previously identified historic property within 0.5 miles of the current project area: SHIP 50-30-11-B006, Puhi Camp Cemetery.
Henry et al. 1993	Archaeological Inventory Survey	Identified two historic properties, neither of which are located within 0.5 miles of the current project area.
Hammatt and Chiogioji 1998	Archaeological Assessment	Identified four historic properties: Grove Farm office building in Puhi, Līhuʻe Mill Bridge, Hoʻomana Overpass Bridge, and Līhuʻe Public Cemetery (no SIHP numbers assigned).
Hammatt and Shideler 2004	Archaeological Inventory Survey and Cultural Impact Assessment	No historic properties identified.
Monahan and Powell 2005	Archaeological Monitoring	Identified 10 historic properties, two of which were traditional Native Hawaiian burials (SIHP 50-30-05-03880 and 50-30-05-03881) that were relocated to the Hawaiian Cemetery on Akialoa Road. No historic properties were identified within 0.5 miles of the current project area.
Hunkin et al. 2014	Archaeological Inventory Survey	Documented 1 newly identified historic property (SIHP 50-30-11-02220), and 1 previously identified historic property (SIHP 50-30-11-02179), , four water control features (Features A through D) associated with Lihue Plantation, which is within 0.5 miles of the current project area. Feature A: reservoir, Feature B: drainage ditch, Features C and D: irrigation ditches. The site was assessed as significant under Criterion d and archaeological monitoring was recommended for future work.
McMahon and Tolleson 2015	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Kamai et al. 2016	Archaeological Inventory Survey	Identified 1 new historic property (SIHP 50-30-11-02307) and 3 previously identified historic properties (SIHP -B006, -02179, -02220). Three historic properties were within 0.5 miles of the project area: Puhi Camp Cemetery (SIHP -B006), Lihue Plantation irrigation features (SIHP -02179), and a subsurface trash deposit associated with the former Puhi Camp (SIHP -02307). All 3 were assessed as significant under Criterion d, with SIHP -B006 also assessed as significant under Criterion e. No further work was recommended for SIHP -02179 and SIHP -02307, preservation was recommended for SIHP -B006.
Folk et al. 2021	Archaeological Monitoring	No historic properties identified.

Note: Previous studies that include the current project area are highlighted in gray.

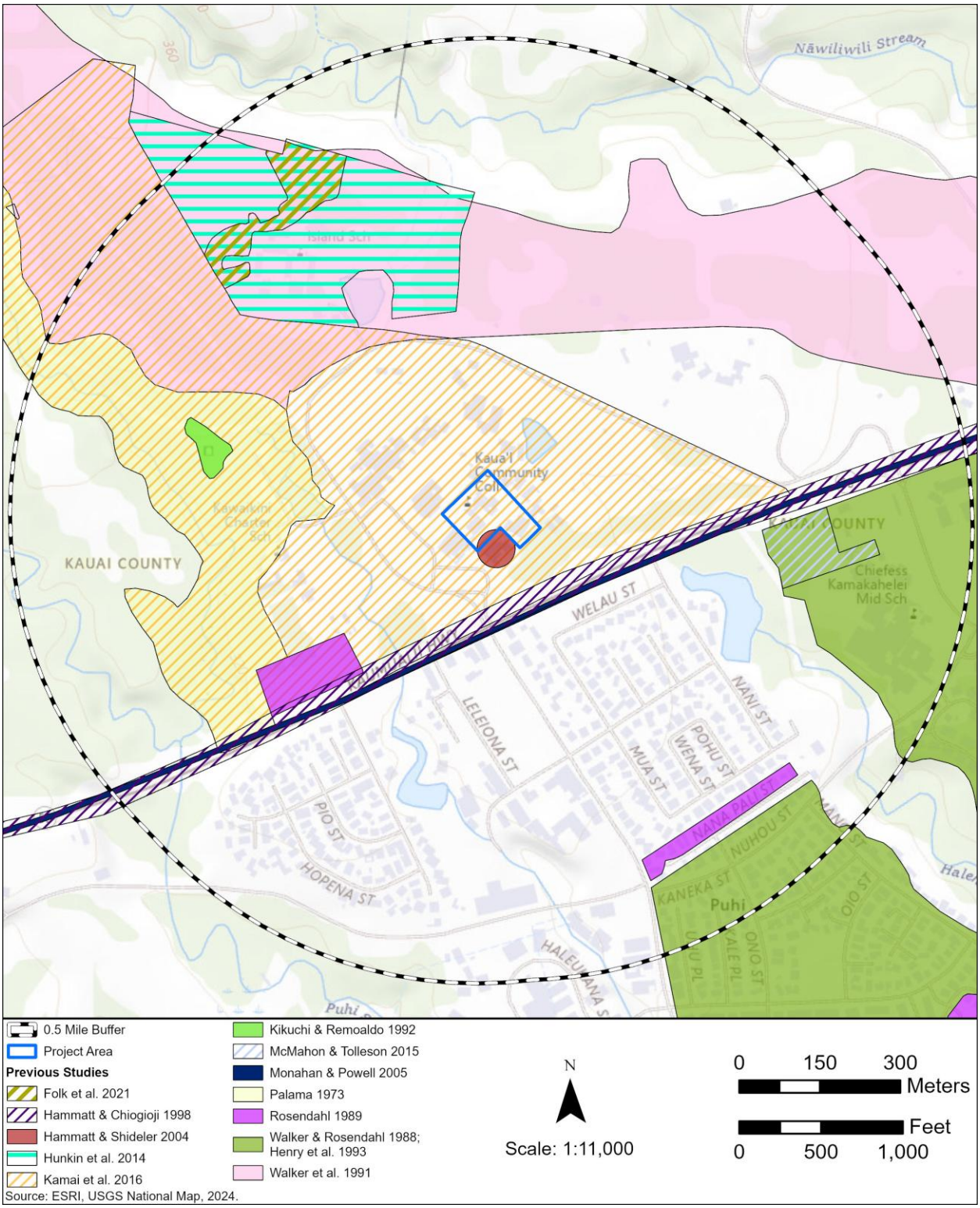


Figure 50. Previous archaeological studies conducted within 0.5 miles of the Kauaʻi Community College portion of the HIFL project area.

Table 5. Previously Identified Historic Properties within 0.5 Miles of the Nukoli'i Beach Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-30-08-00103	Dune burials	Burial	Pre-Contact	-	d, e	-	Reinterred in burial preserve at Wailua Golf Course	Bennett 1931; Fager and Spear 2000
50-30-08-00885	Irrigation ditch	Agricultural	Post-Contact	-	d	-	No Further Work	Dega and Powell 2003
50-30-08-01838	Cultural deposit (2) and reinterment area	Habitation; Burial	Pre-Contact	A, C*	a, d	-	FDC, PAI* (Walker); PAI (Corbin)	Walker et al. 1991; Corbin et al. 2002; On File, SHPD
50-30-08-01846	Concrete bridge	Transportation	Post-Contact	-	a, d	-	FDC (Walker); PAI (Corbin)	Walker et al. 1991; Corbin et al. 2002
50-30-08-02235	Canal	Water control	Post-Contact	-	d	-	No Further Work	Soltz et al. 2014

Note: historic properties located within the current project area are denoted by a gray highlight.

- Rather than using Hawai'i Register of Historic Places significance Criteria, PHRI assigned their own significance categories, which are defined as follows:

A=Important for information content, further data collection necessary (PHRI=research value);
X=Important information content, no further data collection necessary (PHRI=research value, DLNR-HPP=not significant);
B=Excellent example of site type at local, region, island, State, or National level (PHRI=interpretive value); and
C=Culturally significant (PHRI=cultural value).

†PHRI also defined their own recommendations:
FDC=Further data collection necessary (further survey and testing, and possibly subsequent data recovery/mitigation excavations);
NFW=No further work of any kind necessary, sufficient data collected, archaeological clearance recommended, no preservation potential;
PID=Preservation with some level of interpretive development recommended (including appropriate related data recovery work; and
PAI=Preservation "as is,"
* Provisional recommendation pending results of further data collection.

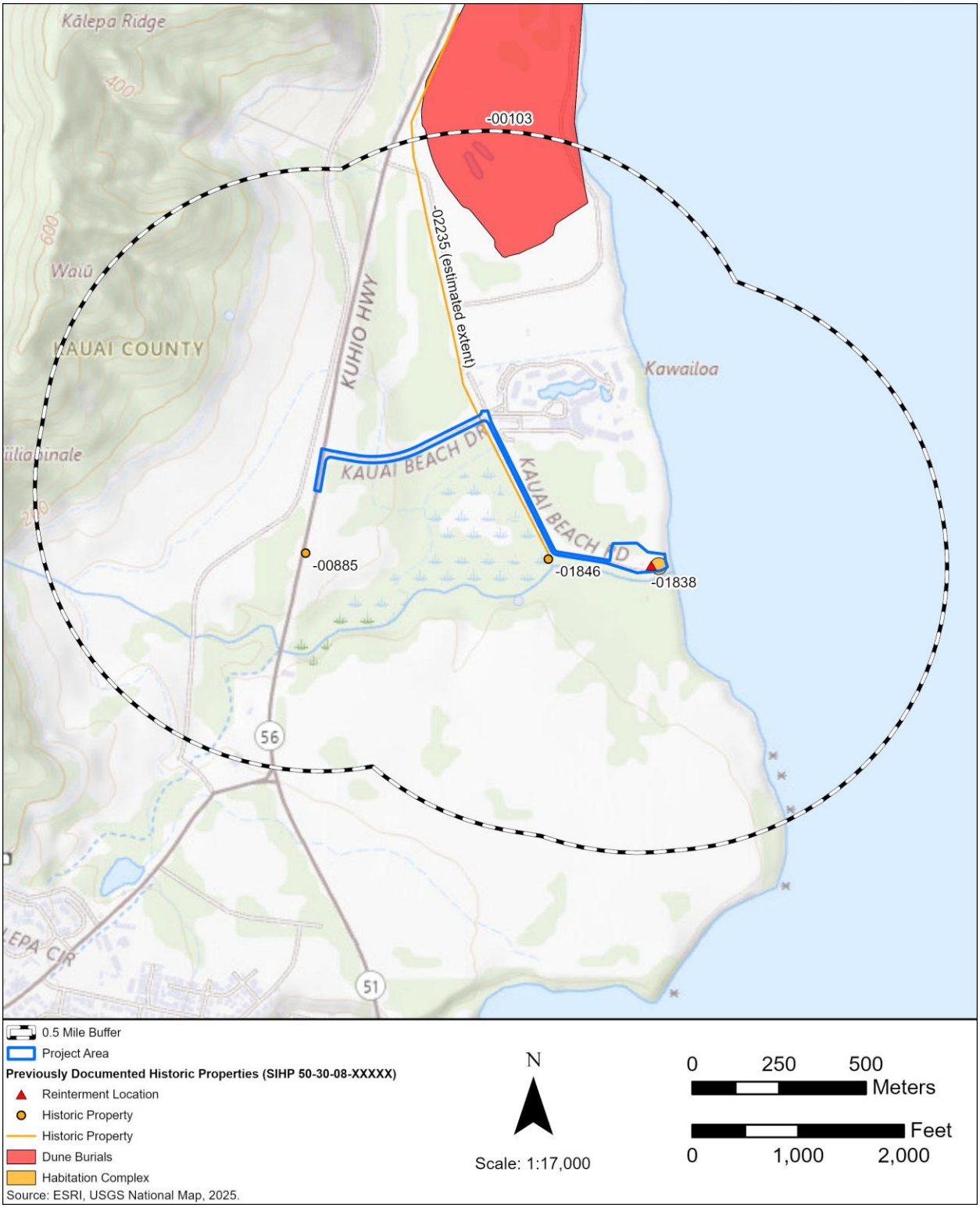


Figure 51. Previously identified historic properties within 0.5 miles of the Nukoli'i Beach portion of the HIFL project area.

Table 6. Previously Identified Historic Properties within 0.5 Miles of the Kauaʻi Community College Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
50-30-11-02179	Lihue Plantation Infrastructure	Agricultural	Post-Contact	d	Archaeological Monitoring (Features A-D) (Hunkin et al. 2014, Folk et al. 2021); No Further Work (Kamai et al. 2016)	Palama 1973; Hunkin et al. 2014; Kamai et al. 2016; Folk et al. 2021
50-30-11-02307	Subsurface trash pit	Refuse disposal	Post-Contact	d	No Further Work	Kamai et al. 2016
50-30-11-09339	Kilohana (Gaylord P. Wilcox House)	Habitation	Post-Contact	c	Preservation	Morrison 1993 (NRHP Nomination Form)
50-30-11-09381	Grove Farm Company Locomotives	Transportation, Industry	Post-Contact	-	Preservation	Schleck and Napoka 1979 (NRHP Nomination Form)
50-30-11-B006	Puhi Camp Cemetery	Burial	Post-Contact	d, e	No further work (Palama 1973); Preservation through avoidance and protection (Kamai et al. 2016)	Palama 1973; Kikuchi and Remoaldo 1992; Kamai et al. 2016
No SIHP	Grove Farm Office Building	Industry	Mid-1930s	-	None provided	Hammatt and Chiogioji 1998

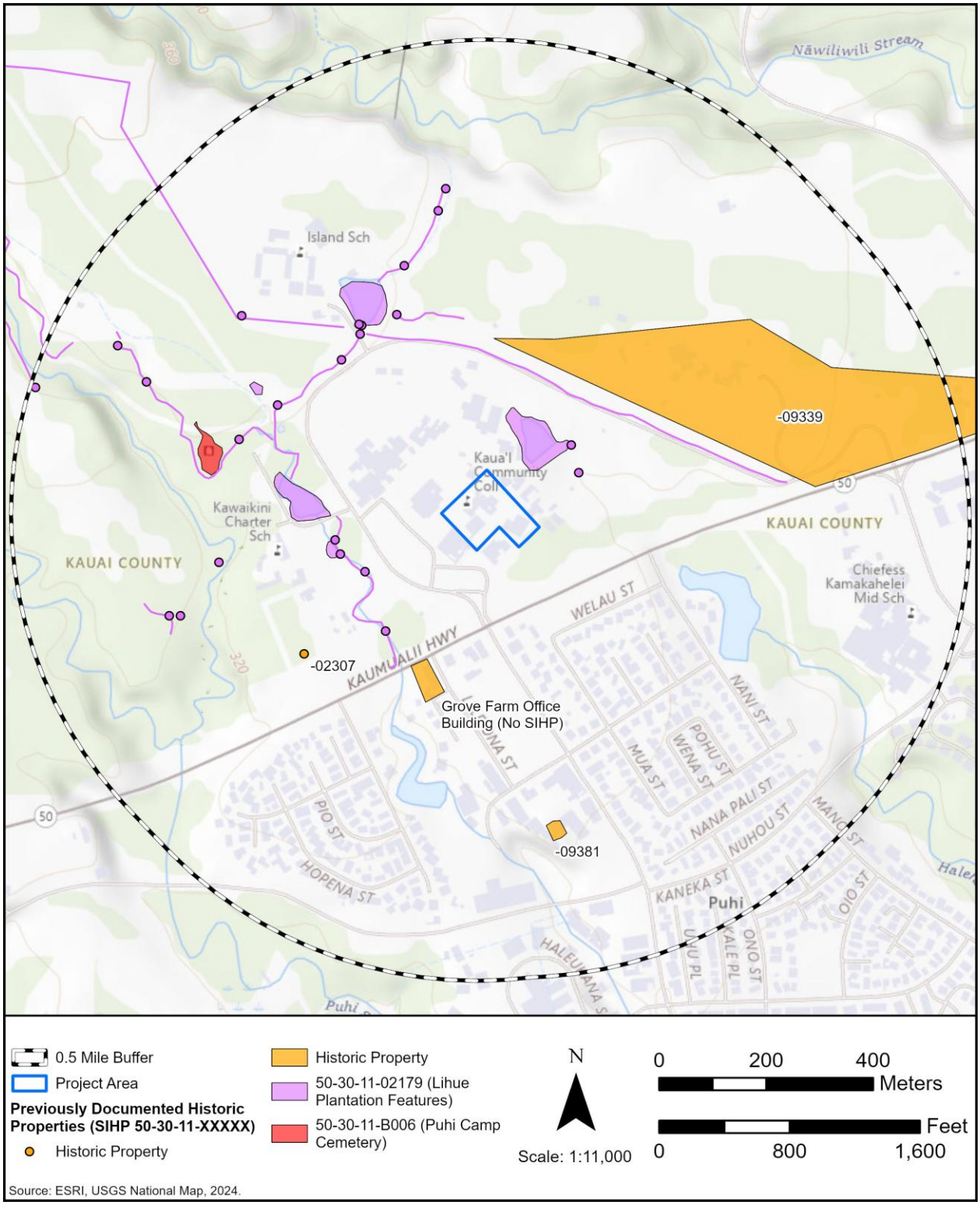


Figure 52. Previously identified historic properties within 0.5 miles of the Kaua'i Community College portion of the HIFL project area.

3.1.11 Summary of Archival and Background Research for the Kauaʻi Cable Landing Site

Both Hanamāʻulu and Niumalu, along with some of the place names associated with each *ahupuaʻa*, are mentioned in *moʻolelo*. Many of the oral historical accounts of Hanamāʻulu recount the canoe landings in the area, which were made easy in the protected bays. The *moʻolelo* also suggest the likelihood of Hanamāʻulu as the residence of some *aliʻi,* as well as the presence of a major *heiau* of *poʻokanaka* class. Intensive agriculture was practiced across Hanamāʻulu, including *loʻi kalo* (Handy 1940:67). Many of the oral historical accounts of Niumalu discuss the botanical landscape, including coconut trees, which are associated with the place name (Pukui et al. 1974:166, Fornander 1918:224), as well as *mokihana*, a species endemic to Kauaʻi. *Mele* also recount the beauty of the area, in addition to the florals. Alakoko Fishpond is one of the most storied locations in Niumalu Ahupuaʻa, and its construction is often attributed to *menehune*, commissioned by *aliʻi*. Handy (1940:67) observed that despite the small size of Niumalu Ahupuaʻa, it was one of the most important areas for fishing on Kauaʻi. Archival sources highlight the population center which grew on the southeastern shore of Kauaʻi, which is now known as the city of Līhuʻe.

The entirety of Hanamāʻulu and Niumalu Ahupuaʻa were awarded to Ke Aliʻi Victoria Kamāmalu as part of a *konohiki* award (LCA 7713, ʻĀpana 2). The *ahupuaʻa* of Niumalu was passed from Kamāmalu, to her father, Kekuanaoa, then to her brother Kamehameha V. Upon his death, it was inherited by her half-sister Ruth Keelikolani, who later sold the land to Paul P. Konoa in 1883 (Ching et al. 1973). Although no LCAs were identified within the Kauaʻi portions of the HIFL project area and the immediate vicinity, there are around 20 *kuleana* parcels claimed within Hanamāʻulu Ahupuaʻa (Soltz et al. 2014) and 24 within Niumalu Ahupuaʻa (Kamai et al. 2016). Most of the awards in both *ahupuaʻa* are described as including *loʻi*, *kula* lands, and house lots (Kamai et al. 2016). Large-scale sugarcane cultivation was the notable post-Contact agricultural endeavor, along with dairy operations.

Beginning in the 1850s, sugarcane agriculture became a major commercial enterprise within both Hanamāʻulu and Niumalu Ahupuaʻa with the establishment of the Lihue Plantation and Grove Farm. Much of the infrastructural development in this area through the nineteenth and early twentieth centuries was tied to the growth of commercial sugarcane agriculture. This included large-scale irrigation infrastructure which diverted water into sugarcane fields, plantation railway systems, mills, Ahukini Pier, and plantation housing for a multi-ethnic labor force. Grove Farm's Puhi Camp was constructed in the location of the present-day Kauaʻi Community College.

Following the December 7, 1941, Japanese attack on Pearl Harbor, Kauaʻi became a strategic site for U.S. military defense. In December 1941, a Japanese submarine surfaced multiple times in the Nāwiliwili Harbor and shelled the shoreline with little to no reported damage. An entire battalion of military personnel were deployed to Kauaʻi in the spring of 1942. The enlisted men were assisted by the Kauai Volunteers, three battalions of about 2,200 citizens. The volunteers, mostly Filipino sugar-laborers, were instructed to man the approximately 150 pillboxes located around Kauaʻi's coastline for beach defense (Bennett 2003:66-70). During World War II, acreages of Grove Farm were used to grow food for the military and the local population, and were also designated as artillery impact areas bordering jungle training areas (Kamai et al. 2016:27).

The cable landing station is located at Kauaʻi Community College in Līhuʻe Town, which was built on 200 acres of Grove Farm's prime cane land in 1972 (Krauss and Alexander 1984:413). Puhi Camp, located southwest of Kauaʻi Community College, was partially destroyed during the construction of the college in the 1970s and fully cleared in the 1980s. In 1989, the Island School was established

north of Kauaʻi Community College, and opened in 1991. It was subsequently expanded to include 20 additional acres in 2000 (DiVito et al. 2021, Island School 2025).

The onshore beach manhole location is at Nukoliʻi Beach. Nukoliʻi was the site of the former Nukolii Dairy, as well as a racetrack and airfield. The land to the north of the Nukoliʻi Beach portion of the project area was acquired in the 1970s; from 1970s through the 1990s, it was the subject of much community opposition to resort development (Turner 1981, Evslin 2016). Ultimately, the resort was built, and the completed resort, today the Outrigger Kauaʻi Beach Resort & Spa, stands as a reminder of the island's shift toward a resort-based economy.

A total of 21 archaeological studies have been conducted within 0.5 miles of the Kauaʻi portions of the HIFL project area at Nukoliʻi Beach and Kauaʻi Community College. These studies have resulted in the identification of 11 historic properties in the vicinity of the project area. Two historic properties have been documented within the Nukoliʻi Beach portion of the HIFL project area: SIHP 50-30-08-01838 and SIHP 50-30-08-02235. SIHP 50-30-08-01838 is a habitation complex consisting of two cultural deposit features and a reinterment area for inadvertently discovered *iwi kūpuna* identified at Nukoliʻi Beach is located in the southeast portion of the project area, closest to the beach and extends past the project area boundary (Walker et al. 1991; Corbin et al. 2002). SIHP 50-30-08-02235 is a post-Contact ditch (Soltz et al. 2014) that runs along the *mauka* side of Kauai Beach Road, crossing the project area in the north. The historic property was assessed as significant under Criterion d and recommended for no further work, however, the placement of temporary fencing or a barricade between the bank and the ditch was advised to prevent construction debris from falling in (Soltz et al. 2014:60-61). A portion of a larger burial complex (SIHP 50-30-08-00103), consisting of 44 burials and 42 isolated finds from previously disturbed burials, is located in close proximity to the northern portion of the project area (Bennett 1931, Fager and Spear 2000). The burials and isolated finds were reinterred at a protected location within Wailua Golf Course. Historic properties documented within 0.5 miles of the Kauaʻi Community College portion of the HIFL project area are associated with plantation-era infrastructure and post-Contact activities, including commercial agriculture, habitation, burial, transportation, and refuse disposal.

3.2 O‘AHU CABLE LANDING SITE

The division of the island of O‘ahu into political land divisions occurred in the fifteenth century under the rule of Mā‘ilikūkahi (Kamakau 1991:54-55). These divisions resulted in the creation of six districts, or *moku*: ‘Ewa, Kona, Ko‘olau Poko, Ko‘olau Loa, Waialua, and Wai‘anae. The O‘ahu portion of the HIFL project area is located in the *ahupua‘a* (traditional land division) of Honouliuli within the *moku* (district) of ‘Ewa. Honouliuli is the largest *ahupua‘a* on the island of O‘ahu (roughly 40,640 acres) and it includes a portion of the ‘Ewa Plain.

‘Ewa is translated as “crooked, out of shape, imperfect, ill-fitting”, or without an *‘okina* (glottal stop diacritic), it is translated as “unstable, swaying, wandering” (Pukui et al. 1974:28, Pukui and Elbert 1986:42). Sterling and Summers noted that ‘Ewa may originate from a *mo‘olelo* (oral tradition) about two gods, Kāne and Kanaloa and how their methods for determining ‘Ewa’s boundaries resulted from a thrown stone that could not be relocated and hence named for the rock being “strayed” (Sterling and Summers 1978:1). The traditional name for Barbers Point is Kalaeloa, translated as “the long point” (Pukui et al. 1974:72). Honouliuli is translated as “dark bay” (Pukui et al. 1974:51). An explanation of the name Honouliuli is provided by Westervelt (1915), who attributes the name of this land to an O‘ahu chief who had the same name.

3.2.1 Significant Place Names

A selection of place names associated with Honouliuli Ahupua‘a are included in Table 7, and have been identified through Boundary Commission Testimonies, historic maps, Wahl (2021), and information received from consultation participants (Figure 53). Literal translations of place names have been added to Table 7 when they could be found in existing literature (e.g., Pukui and Elbert 1986, Pukui et al. 1974).

Table 7. Place Names Associated with Honouliuli Ahupuaʻa

Place Name	Meaning	Source
Fish Weir Point	Named place	Malden 1825
Honouliuli Village and Taro Land	Land division, village, and gulch; *lit.* "dark bay" (Pukui et al. 1974:51); land may have been named for an Oʻahu chief of the same name (Westervelt 1915). Honouliuli Village was located on the northwest side of Puʻuloa (present-day Pearl Harbor) where the Honouliuli Stream enters the bay (Tuggle and Tomonari-Tuggle 1997)and was known to be a place where *kalo* was grown (Malden 1825)	Malden 1825
Kaʻala	Gulch, highest mountain on Oʻahu; also known as Puʻu-kaʻala (Pukui et al. 1974:59).	Malden 1825
Kāhekaheka at Honouliuli	Salt pans near *loʻi kalo*	Uyeoka et al. 2018, Wahl 2021
Kāhekaheka at Puʻuloa	Salt pans at Keahi	Uyeoka et al. 2018, Wahl 2021
Ka Leina a ka ʻUhane	*Wahi pana*; not identified on Figure 53, as the boundaries are amorphous and encompass the entire region; *lit.* "the leaping of the spirit (into the nether world)" (Pukui et al. 1974:76); area where wandering spirits, if guided by relatives or *ʻaumakua*, passed into the *ao ʻaumaku.* This *wahi pana* is considered by many to be in Kaʻena, but given the association with Kaupeʻa, Kamaʻomaʻo, and Kānehili, much of the ʻEwa Plain might be considered within the realm of this *leina a ka ʻuhane* (Kane 2011:3, Kamakau 2000:48, Maly and Maly 2012:16, Maly 2014:18).	Maly and Maly 2012
Kalaeloa	Point; *lit.* "the long point," old name for Barber's Point, where Captain Henry Barber went aground in 1796 (Pukui et al. 1974:72).	Jackson 1884
Kalanamaihiki Koʻa	Fishing shrine	Uyeoka et al. 2018, Wahl 2021
Kānehili	*Kula* (plain)*;* considered to be open, uninhabited and inhospitable, associated with Kaupeʻa as a place of wandering spirits, or realm of *ao kuewa* or *ao ʻauwana* (Maly and Maly 2012:18, 24, Maly and Maly 2014:16)	Maly and Maly 2012
Kaupeʻa	*Kula* (plain); *lit.* "crisscross, interwoven," (Pukui and Elbert 1986:139) or the "bat's perch" (*peʻa* translated as bat) in relation to Hanaiakamalama (the Southern Cross constellation), which only one star of was visible from the ʻEwa Plain, and pointed toward Kahiki (Kane 2011:3). Associated with Kānehili as a place of wandering spirits, or realm of *ao kuewa* or *ao ʻauwana* (Maly and Maly 2012:18).	Pukui and Elbert 1986
Keahi	Point; located west of Pearl Harbor, noted as a prime fishing ground for *ʻōʻio* fish (*Albula vulpes;* Sterling and Summers 1978:44) and as a surfing site; *lit.* "the fire" (Pukui et al. 1974:100). One source (Wahl 2021) identified *kāhekaheka* (salt pans) at Keahi.	Monsarrat 1881
Koʻolina	Named place; referred to as "a lovely and delightful place," home to the chief Kākuhihewa, and cared for by the priest Napuaikamao (Sterling and Summers 1978:41).	Malden 1825

Place Name	Meaning	Source
Kualakaʻi	Area; near Kalaeloa; *lit.* "*Tethys* (a sea creature)," (Pukui et al. 1974:119); associated with a spring named Hoakalei (*lei* reflection), "because Hiʻiaka picked *lehua* flowers here to make a *lei* and saw her reflection in the water" (Pukui et al. 1974:119).	Monsarrat 1881
Laulaunui Fishpond	*Loko kuapā* (walled fishpond); *lit.* "*l*arge leaf package" (Pukui et al. 1974:129).	Uyeoka et al. 2018, Wahl 2021
Loko Kapākule	*Loko ʻume ike* (fish trap); *lit.* "the *akule* fish enclosure (*kule* is short for *akule*);" old name for a fishpond built by *Menehune* and dredged when Pearl Harbor was developed; home of Ka-ʻahu-pāhau (Pukui et al. 1974:87).	Uyeoka et al. 2018, Wahl 2021
Loko ʻOkiʻokilepe	*Loko kuapā; lit.* "cut strips," could be spelled "ʻOkiʻoki-lepe" (Pukui et al. 1974:169).	Uyeoka et al. 2018, Wahl 2021
Loko Pāmoku (Kapāmoku)	Loko kuapā	Uyeoka et al. 2018, Wahl 2021
Maunakapu	Mountain in Waiʻanae Mountain Range separating Nānākuli and Honouliuli forest reserves, *lit.* "sacred mountain" (Pukui et al. 1974:148).	Uyeoka et al. 2018, Wahl 2021
Maunauna	*Puʻu; lit.* "Mountain sent [on errands]. (Two servant *moʻo* who lived here had no keepers to supply their needs)" (Pukui et al. 1974:149).	Uyeoka et al. 2018, Wahl 2021
Pālehua	Land division, *puʻu*; *lit.* "*lehua* flower enclosure" (Pukui et al. 1974:177),	Uyeoka et al. 2018, Wahl 2021
Palikea	Peak; *lit.* "white cliff" (Pukui et al. 1974:177).	Uyeoka et al. 2018, Wahl 2021
Pili o Kahe	Land section, boundary between ʻEwa and Waiʻanae; *lit.* "clinging to Kahe" (Pukui et al. 1974:185).	Uyeoka et al. 2018, Wahl 2021
Pōhākea Pass	Mountain pass in Waiʻanae Mountains; *lit.* "white stone (*pōhā* is short for *pōhaku*);" "from here Hiʻiaka saw cloud omens that her *lehua* groves on Hawaiʻi had been burned by Pele, and that her friend Hōpoe had been turned to stone; this is where Ka-uhi brutally murdered his wife, Ka-hala-o-Puna, because he thought she had been defiled" (Pukui et al. 1974:185).	Uyeoka et al. 2018, Wahl 2021
Pōhaku Pālahalaha (or Pālaha)	Boundary marker	Uyeoka et al. 2018, Wahl 2021
Puhilele	Point; *lit.* "leaping eel" (Pukui et al. 1974:192); location of the Barbers Point Lighthouse.	Jackson 1884
Puʻu Hāpapa	Mountain in Waiʻanae Mountains; *lit.* "rock stratum" (Pukui et al. 1974:41).	Uyeoka et al. 2018, Wahl 2021
Puʻu Kānehoa	Peak; named for native shrubs (Pukui et al. 1974:198).	Uyeoka et al. 2018, Wahl 2021
Puʻu Kapuaʻi	*Puʻu; lit.* "footprint hill" (Pukui et al. 1974:199).	Uyeoka et al. 2018, Wahl 2021
Puʻu Kauʻa	*Puʻu; lit.* "war hill *or* fort hill" (Pukui et al. 1974:199).	Uyeoka et al. 2018, Wahl 2021
Puʻu Kuina Heiau	Heiau	Uyeoka et al. 2018, Wahl 2021
Puʻu Kuʻua Heiau	*Puʻu; lit.*"relinquished hill" where Pele's sister Kapo once left her flying vagina (*kohe lele*). Exact location of *heiau* is unknown.	Uyeoka et al. 2018, Wahl 2021
Puʻu Makakilo	*Puʻu*; *lit.* "observing eyes" (Pukui et al. 1974:140); one of five storied brothers who watches over Oʻahu (Swift and Mulrooney 2022).	Uyeoka et al. 2018, Wahl 2021

Place Name	Meaning	Source
Puʻu Manawahua	*Puʻu; lit.* "great grief hill *or* nausea hill" (Pukui et al. 1974:202); divides ʻEwa and Waiʻanae	Uyeoka et al. 2018, Wahl 2021
Puʻu Moʻopuna/ Namoʻopuna	*Puʻu; lit.* "grandchild hill" (Pukui et al. 1974:202).	Uyeoka et al. 2018, Wahl 2021
Puʻu Pouilihale	*Puʻu; lit.* "dark house hill" (Pukui et al. 1974:205)	Uyeoka et al. 2018, Wahl 2021
Puʻukapolei/Puʻu o Kapolei Heaiu	*Puʻu*; *lit.* "beloved Kapo (a sister of Pele)" (Pukui et al. 1974:89); also known as Puʻukapolei, Puu-o-kapolei, or Puʻu o Kapolei; large rock shelter identified by McAllister (1933) on the side of the *puʻu,* where Kamapuaʻa and Kamaunuaniho lived, after Kamapuaʻa established his grandmother here as queen after conquering much of Oʻahu (Sterling and Summers 1978:33). Puʻu o Kapolei Heiau (Site 138) identified in the vicinity of the rock shelter (McAllister 1933:108).	Monsarrat 1881
Puʻuloa	*ʻili*; *lit.* "long hill" (Pukui et al. 1974:200-201); Hawaiian name for the multiple lochs and harbors now known as "Pearl Harbor (Ke-awa-lau-o-Puʻuloa, formed from ʻdrowned seaward valleys of ʻEwaʻs mains streams'; (Handy and Handy 1972:469)" named for the pearl oysters formerly found there (Pukui et al. 1974:182). It was said that breadfruit was brought to Puʻuloa from Sāmoa (Pukui et al. 1974:200-201).	Pukui et al. 1974
Puʻupālailai	*Puʻu*; *lit.* "young *lai* fish hill" (Pukui et al. 1974:205).	Monsarrat 1881
Waimānalo	Land division, gulch; *lit.* "potable water" and the site of the home of Chief Kākuhihewa (Pukui et al. 1974:225).	Monsarrat 1881

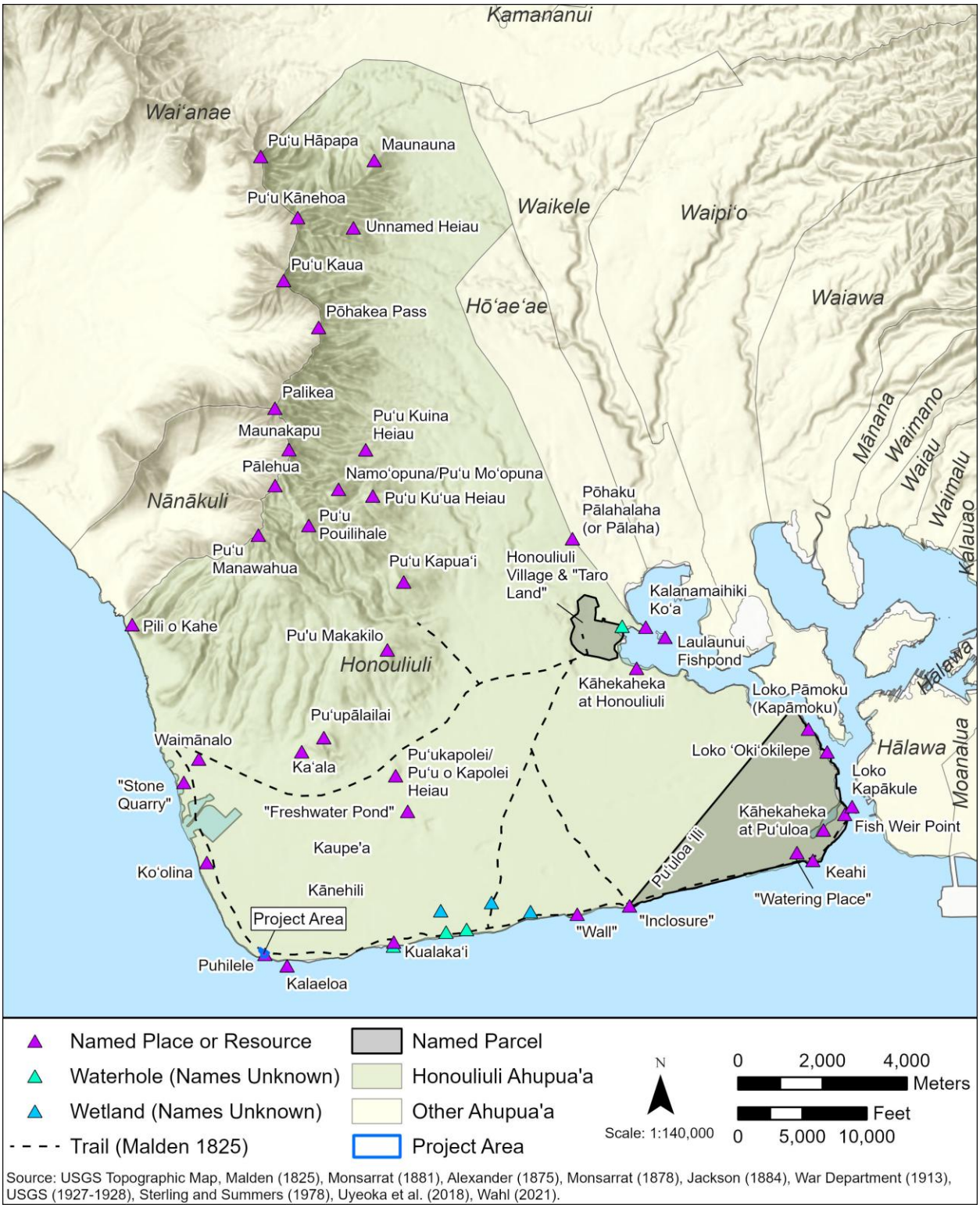


Figure 53. Map of significant place names in Honouliuli Ahupuaʻa.

3.2.2 Moʻolelo

Many of the oral historical accounts of Honouliuli that have been translated into English focus on its eastern periphery in the area surrounding West Loch, generally known to be the political and cultural center of Honouliuli Ahupuaʻa. However, a small number of accounts also pertain to central inland Honouliuli. Some of these accounts are related here. The reader is also referred to Maly (2022) for a detailed account of significant place names and *moʻolelo* of Honouliuli Ahupuaʻa.

Hiʻiakaikapoliopele

Excerpts from two English translations of the famous *moʻolelo* of Hiʻiakaikapoliopele make reference to significant place names and characteristics of Honouliuli. Nogelmeier (2006) published a landmark two-volume set including an English translation of *Ka Moʻolelo o Hiʻiakaikapoliopele* ("The Epic Tale of Hiʻiakaikapoliopele: Woman of the Sunrise, Lighting-Skirted Beauty of Halemaʻumaʻu"), originally written by Hoʻoulumāhiehie and published in *Ka Naʻi Aupuni* from 1905 to 1906. The translation provided by Maly (2022) derives from He *Moʻolelo Kaʻao no Hiʻiaka-i-ka-poli-o-pele*, or "A Hawaiian Tradition of Hiʻiaka who is Held in the Bosom of Pele," which was published in *Ka Hoku o Hawaii* from 1924 through 1928. In the epic tale, Hiʻiaka travels across the lands of Honouliuli, and a number of significant places, people, and resources are referenced.

When Hiʻiaka reached the plains of Honouliuli, she found Puʻuokapolei and Nāwāhineokamaʻomaʻo relaxing under the shade of *ʻohai* (*Sesbania tomentosa*). She called out a greeting chant to them, so they would not say to each other later that Hiʻiaka had failed to acknowledge them:

> Greetings to you, O Puʻuokapolei
> O Nāwāhineokamaʻomaʻo
> Sitting there, where you dwell
> In the shade of the ʻōhai
> Stringing kukui blossom garlands in the sun
> Wearing lei of the maʻomaʻo flower
> Lei of bright kaunoʻa upon the strand of Koʻolina
> Such a festive way, all about. (Nogelmeier 2006:270)

However, Puʻuokapolei warned Hiʻiaka not to stay long with them, as they did not have any vegetables or meat to share, nor *kapa* (barkcloth) for clothing or covers. Their only *kapa* was the red *pilipili* (*pili*; *Heteropogon contortus*) grass, which they would weave together and wear until it dried out. Noting the heat of the Honouliuli plains surrounding the hill of Puʻuokapolei, Hiʻiaka chanted:

> Kona is dazed by the powerful Makaliʻi-season sun
> The wiliwili trees sway, moving in the calm
> Long suffering are the grasses of Kānehili
> The sun is oppressively hot at Puʻuokapolei
> The maʻo is stunted, standing at the shore
> The blossom of the nohu is like a yellow halakea kapa
> Flashing, blooming bright in the strands of Kaupeʻa
> As a companion
> Befriending the wind, a gusting Nāulu
> A companion indeed. (Nogelmeier 2006:271)

She offered another chant as she traveled from the uplands of Honouliuli towards the sea:

> My dear man of the branching lochs of Puʻuloa
> From the plains of Peʻekāua to dwell
> Let us stay where the ʻōhai grows
> Amid the wiliwili trees and the blossoms of abundant noni
> On the descent to Kānehili
> I have strayed, ah. (Nogelmeier 2006:271)

Hiʻiaka traveled through the plain of Kaupeʻa and arrived at a cool spring at Kualakai called Hoakalei, which lies on the shore to the east of the project area. When she looked into the pool, she saw two *lehua* trees in bloom on either side of the pool, and strung four *lei* from its blossoms. After this, she heard her sister Kapo chant a *mele* about her actions:

> Hiʻiaka, the woman
> Plucks the blossoms of Hoakalei
> Stringing them, piercing with the needle
> Fourfold are the lei, the lehua garlands of the woman
> My little sister
> Little sister from the gusty winds of to the lee
> Rushing along to the sea of Hilo One
> For Hilo is the affection
> Beloved indeed is the lei. (Nogelmeier 2006:272)

According to Nogelmeier, Hilo One is an Oʻahu name for "a spot on the western side of Kualakai, adjoining Kalaeloa" (Nogelmeier 2006:272). As Hiʻiaka continued her journey towards Puʻuloa, she chanted again about the vast plain of Kaupeʻa:

> I shall not tread Kaupeʻa's expanse
> That stretch where the sun beats down on the plain
> The sun is right overhead, at the navel of Wākea
> I am spared by the Māunuunu wind
> By the uplifting ʻAoʻaoa breeze
> Urging the Nāulu storm clouds to pour down their waters
> The natives here survive on water from the clouds
> Which billowing clouds carry along to the branching lochs
> Compelling Hiʻiaka to trudge that open stretch
> Duty making rest forbidden there
> There I heard the happy trill of the ʻōʻō bird on the plain
> Befriending the sea of Wāwaemoku
> My heart grieves, thrashed by harm
> I may be harmed by this person upon arrival
> Leaving the birds to feed expansively
> On the blossoms of the wiliwili trees… (Nogelmeier 2006:275)

A later chant also makes reference to the *ʻohai* and *wiliwili* (*Erythrina sandwicensis*), as well as the "blossoms of Kaiona's noni groves at Kānehili" (Nogelmeier 2006:280). Maly (2022) observed that the tale makes reference to Pālailai and Kaʻala, both of which are located in the uplands and to the west of the project area:

> …Turning her gaze towards the island of Hawaii, she could see the flames of Pele in the lehua forest of Hopoe, and she chanted out—

Beautiful is Palailai, sacred assembly of the woman,
I set up the drum of the sacred voice,
The voice of the ocean is what I hear,
The natives hear it
[The stormy ocean of Waialua, could reportedly be heard in Ewa],
The birds drink the water caught in the noni leaves,
The billowy clouds pass in the calm,
The fires of Hawaii rise above me… (Maly 2022:7)

Of Kaala:

Seeing the beauty of Kaala, Hiiaka chanted:

Beloved is the dew of Kaala,
That dew which bears the fragrance of the nene grasses,
[fragrant dew which] Kissed the natives of Puuloa,
One searches far for love… (Maly 2022:5)

Puʻu o Kapolei

Puʻu o Kapolei translates to "hill of the beloved Kapo," and refers to an elder sister of the Goddess Pele (Pukui et al. 1974:89, Nogelmeier 2006). Sterling and Summers (1978) noted that Puʻu o Kapolei was "one of the most famous hills in the olden days" (Sterling and Summers 1978:33), and a major point of reference for travelers going east or west through Honouliuli. McAllister (1933) observed that the old government road passed behind Puʻu o Kapolei, and the area was covered in sugarcane by the late 1890s (McAllister 1933:108). ʻIʻī also referenced this trail as one of the three routes to Waiʻanae: "As mentioned before, there were three trails to Waianae, one by way of Puu o Kapolei, another by way of Pohakea, and the third by way of Kolekole" (ʻIʻī 1959:97).

Puʻu o Kapolei was also a landmark used to mark the changing of the seasons on Oʻahu:

> When the sun reached the equator and (began to) move northward, it set right over (the islet of) Kaʻula and it moved on and set over Kawaihoa; and the Makaliʻi season when the sun set (kau) from Kaʻula to Kawaihoa was called Kau, and the Kau season was also called after the resting place of Kane (Kau-lana-a-Kane). When it set (again) at Kaʻula and turned south the season was called Hoʻoilo. In the same way the people of Oahu reckoned from the time when the sun set over Puʻuokapolei until it set in the hollow of Mahinaona and called this period Kau, and when it moved south again from Puʻuokapolei and it grew cold and the time came when young sprouts started, the season was called from their germination (oilo) the season of Hoʻoilo. There were therefore two seasons, the season of Makaliʻi and the season of Hoʻoilo. (Kamakau as quoted by Sterling and Summers 1978:34)

Kamaunuaniho, the grandmother of Kamapuaʻa, is said to have had a house on Puʻu o Kapolei. However, the area around this house may have been disturbed or dismantled during post-Contact sugarcane and sisal planting.

A story of Kamaunuaniho told by Emma Nakuina is recounted in Sterling and Summers (1978):

> Kamapuaa subsequently conquered most of the island of Oahu, and, installing his grandmother as queen, took her to Puuokapolei, the lesser of the two hillocks forming the southeastern spur of the Waianae mountain range, and made her establish court there. This was to compel the people who were to pay tribute to bring all the necessities of life from a distance, to show his absolute power over all.
>
> Puuokapolei is some little distance from Sisal, towards Waianae, and is as desolate a spot as could be picked out on the whole island. It is almost equally distant from the sea, from which came the fish supplies; from the taro and potato patches of Ewa, and from the mountain ravines containing the banana and sugarcane plantations.
>
> A very short time ago the foundations of Kamaunuaniho's house could still be seen at Puuokapolei; also the remains of the stone wall surrounding her home. It has even been said that her grave could then be identified, but since the extension of cane and sisal planting to the base of Puukapolei, it is possible that the stones may have been removed for wall-making. (Nakuina as quoted by Sterling and Summers 1978:34)

McAllister (1933) observed a large rock shelter on the side of Puʻu o Kapolei which was rumored to be this dwelling place of Kamapuaʻa and Kamaunuaniho. He also documented the Puʻu o Kapolei Heiau (Site 138) in the same vicinity (McAllister 1933:108). Puʻu o Kapolei has been nominated as a traditional cultural property (Monahan 2020).

3.2.3 ʻŌlelo Noʻeau

A selection of *ʻōlelo noʻeau* pertinent to Honouliuli and ʻEwa are compiled here, along with their translations and interpretations from Pukui (1983).

One *ʻōlelo noʻeau* references the *ʻanaeholo* (travelling mullet, or *ʻamaʻama*; *Mugil cephalus*) fish that populated Honouliuli:

> 1330. Ka iʻa hali a ka makani.
> *The fish fetched by the wind.*
> The *ʻanaeholo*, a fish that travels from Honouliuli, where it breeds, to Kaiapāpaʻu on the windward side of Oʻahu. It then turns about and returns to its original home. It is driven closer to shore when the wind is strong.

Many more *ʻōlelo noʻeau* reference ʻEwa Moku more broadly, but still likely have relevance to Honouliuli. Some mention the area's characteristic red earth:

> 80. ʻĀina koi ʻula i ka lepo.
> *Land reddened by the rising dust.*
> Said of ʻEwa, Oʻahu.
>
> 2357. O ʻEwa, ʻāina kai ʻula i ka lepo.
> *ʻEwa, land of the sea reddened by earth*.
> ʻEwa was once noted for being dusty, and its sea was reddened by mud in time of rain.

Others speak to political organization in ʻEwa:

> 1855. Ku aʻe ʻEwa; Noho iho ʻEwa.
> *Stand-up ʻEwa; Sit-down ʻEwa.*

The names of two stones, now destroyed, that once marked the boundary between the chiefs' land (Kuaʻe ʻEwa) and that of the commoners (Noho iho ʻEwa) in ʻEwa, Oʻahu.

386. ʻEwa nui a Laʻakona.
Great ʻEwa of Laʻakona.
Laʻakona was a chief of ʻEwa, which was prosperous in his day.

Most of the *ʻōlelo noʻeau* concerning ʻEwa make reference to the kinds of resources in the area. This includes the beloved Kāī O ʻEwa varieties of *kalo* (taro, *Colocasia esculenta*), the abundance of *nehu* (Hawaiian anchovy; *Encrasicholina purpurea*) in Pearl Harbor, and practices associated with gathering *pipi* (Hawaiian pearl oyster; *Pinctada radiata*):

2770. Ua ʻai ke kāī-koi o ʻEwa
He has eaten the kāī-koi taro of ʻEwa.
Kāī is Oʻahu's best eating taro; one who has eaten it will always like it. Said of a youth or a maiden of ʻEwa, who, like the kāī taro, is not easily forgotten.

661. He kai puhi nehu, puhi lala ke kai o ʻEwa.
A sea that blows up nehu fish, blows up a quantity of them, is the sea of ʻEwa.

1721. Ke kai heʻe nehu o ʻEwa.
The sea where the nehu come in schools to ʻEwa.
Nehu (anchovy) come by the millions into Pearl Harbor. They are used as bait for fishing, or eaten dried or fresh.

123. Anu o ʻEwa i ka iʻa hāmau leo e. E hāmau!
ʻEwa is made cold by the fish that silences the voice. Hush!
A warning to keep still. First uttered by Hiʻiaka to her friend Wahineʻomaʻo to warn her not to speak to Lohiʻau while they were in a canoe near ʻEwa.

493. Haunāele ʻEwa i ka Moaʻe
ʻEwa is disturbed by the Moaʻe wind.
Used about something disturbing, like a violent argument. When the people of ʻEwa went to gather the *pipi* (pearl oyster), they did so in silence, for if they spoke, a Moaʻe breeze would suddenly blow across the water, rippling it, and the oysters would disappear.

1331. Ka iʻa hāmau leo o ʻEwa.
The fish of ʻEwa that silences the voice.
The pearl oyster, which has to be gathered in silence.

1357. Ka iʻa kuhi lima o ʻEwa.
The gesturing fish of ʻEwa.

The pipi, or pearl oyster. Fishermen did not speak when fishing for them but gestured to each other like deaf-mutes.

Kamakau (1991) offered another saying related to the abundant nehu in the lochs of Puʻuloa, and the leader Laʻakona: "*He kai puhi nehu, puhi lala ke kai o ʻEwa e, e noho i ka laʻi o ʻEwa nui a Laʻakona* ("A sea that blows up *nehu*, blows them up in rows, is ʻEwa, until they rest in the calm of great ʻEwa-a-Laʻakona")" (Kamakau 1991:84).

3.2.4 Settlement and Land Use

Handy and Handy (1972:471) depict the deep bays of Puʻuloa (currently known as Pearl Harbor) as the most significant feature of the ʻEwa District as it provided an ideal environment for the cultivation of *loʻi kalo* (irrigated taro) along its irrigable lowlands, and for creating fishponds and traps in its multiple bays fed with tidal waters. The bays contained *pipi*, or pearl oysters, for which the bay is currently named (Handy and Handy 1972:471). The highly valued *pipi* was referenced often in Hawaiian *moʻolelo* and *ʻōlelo noʻeau* as a resource to be collected only in quiet and that it was well-protected by Hawaiian deities, such as the *moʻo* (water spirit) deity Kanekuaʻana.

ʻEwa was renowned for its rich marine life and *limu* (edible algae, seaweed) that filled the surrounding waters. An oral history interview with Mark Kahalekulu revealed the many fish that inhabited the area, including *moi* (Pacific threadfin; *Polydactylus sexfilis*), *awa* (milkfish; *Chanos chanos*), *kala* (bluespine unicornfish; *Naso unicornis*), *palani* (eyestripe surgeonfish; *Acanthurus dussumieri*), *manini* (convict tang; *Acanthurus triostegus sandvicensis*), *ʻōhua* (bluelined wrasse; *Stethojulis albovittate*), *ʻamaʻama* (young mullet; *Mugil cephalus*), *āholehole* (reticulated flagtail; *Kuhlia sandvicensis*), *ʻōpae* (red pond shrimp; *Halocaridina rubra*), *heʻe* (octopus; *Octopus cyanea*), and the prized *ʻanae* (adult mullet, *Mugil cephalus*) (Maly and Maly 2014:559). One *moʻolelo* depicts the migration of the *ʻanae* as *ʻamaʻama*, young mullet. Although in a different life stage, these *iʻa* (fish) followed the same migratory pattern, moving from Honouliuli to Lāʻie (Titcomb and Pukui 1972:231). According to Wahl (2021), salt making was also an important cultural practice along the Honouliuli coast. In the 1800s, the practice became industrialized with the operation of the Puʻuloa Salt Works from the 1840s to early 1900s.

Limu along the ʻEwa coast could reach a height of two to three feet and included various important types such as *līpoa* (*Dictyopteris plagiogramma*), *kala* (*Sargassum echinocarpum*), and *manauea* (*Gracilaria coronopifolia*) (Kahalekulu, in Maly and Maly 2014:259). During certain seasons, Kahalekulu recalled that as a child he could smell the *limu* from Pōhākea Elementary School. Video interviews with the late Michael Kumukauoha Lee have highlighted the past and contemporary significance of *limu*, and the impacts development activities have had on the health of marine ecosystems. *Limu* are an important resource for food, for medicinal uses, and as keystone members of coastal ecosystems (Lee 2013). Lee (2012) called ʻEwa the "mother house of all limu," and as the progenitor for *limu* across the island. He identified four types of *limu* as the most popular: *manauea, pālahalaha* (*Ulva fasciata*), *līpoa* (*D. plagiogramma* and *D. australis*), and *limu kohu* (*Asparagopsis taxiformis*) (Lee 2013). Of the Hawaiian species of *limu*, Lee added, "we call them kokua limu. They work together" (Lee 2012). This contrasts with the invasive species of *limu* that have become prevalent along Hawaiʻi's coastlines, which have overtaken rather than integrated into the Hawaiian *limu* system. Lee emphasized the importance of freshwater inputs to *limu* health, and that underground caves would collect water from the mountains and bring it into the ocean to provide important nutrients to the seaweed. He argued that the decline of *limu* and fishes in western Oʻahu was due to a lack of freshwater, and cited the diversion of freshwater from the coast as well as polluted runoff and heavy metals leeching into the ocean from development activities as the main causes (Lee 2012, Lee 2013).

Frierson (1972) compiled a list of plant species present in Honouliuli prior to 1790, along with some of their potential uses. The species listed by Frierson include *ʻōhiʻa lehua* (*Metrosideros polymorpha*), *kukui* (candlenut; *Aleurites moluccana*), *wiliwili* (*Erythrina sandwicensis*), *koa* (*Acacia koa*), *hala* (pandanus, screwpine; *Pandanus tectorius*), *hau* (*Hibiscus tiliaceus*), *ʻōhiʻa ʻai* (mountain apple; *Syzygium malaccense*), *wauke* (paper mulberry; *Broussonetia papyrifera*), *kī* (ti, *Cordyline*

fruticose), *maiʻa* (banana; *Musa* sp.), *pia* (arrowroot; *Tacca leontopetaloides*), *milo* (*Thespesia populnea*), *neneleau* (sumac; *Rhus sandwicensis*), *ʻilima* (*Sida fallax*), *ʻakiʻaki* (rush grass; *Sporobolus virginicus*), *hāpuʻu* (Hawaiian tree fern; *Cibotium chamissoi*), *pūkiawe* (*Styphelia tameiameiae*), *ʻiliahi* (sandalwood; *Santalum ellipticum*), *kou* (*Cordia subcordata*), *lama* (*Diospyros sandwicensis*), *loulu* (fan palm; Pritchardia), *maile* (*Alyxia stellata*), *makaloa* (sedge; *Cyperus laevigatus*), *naio* (false sandalwood; *Myoporum sandwicense*), *olonā* (*Touchardia latifolia*), *pili* (grass; *Heteropogon contortus*), *ʻieʻie* (*Freycinetia arborea*), *māmaki* (*Pipturus albidus*), *kauila* (*Colubrina oppositifolia*), *uhiuhi* (*Mezoneuron kauaiense*), *māmane* (*Sophora chrysophylia*), *ʻape* (*Alocasia macrorrhiza*), *ʻawapuhi* (shampoo ginger; *Zingiber zerumbet*), *noni* (*Morinda citrifolia*), *ʻāheahea* (*Chenopodium oahuense*), *kākonakona* (*Panicum torridum*), *ʻēkaha* (bird's nest fern; *Asplenium nidus*), *honohono wai* (*Commelina nudiflora*), *maʻo* (Hawaiian cotton; *Gossypium tomentosum*), *ʻohe makai* (*Polyscias sandwicensis*), *ʻamaʻu* (*Sadleria cyatheoides*), *ʻūlei* (*Osteomeles anthyllidifolia*), *māhoe* (*Alecryon micrococcus*), *ʻuhaloa* (*Waltheria americana*), *koaliʻai* (African morning-glory; *Ipomoea cairica*), *pāʻūohiʻiaka* (*Jacquementia sandwicensis*), *ʻaiea* (*Nothocestrum breviflorum*), *koʻokoʻolau* (*Bidens wiebkei*), *olopua* (*Osmanthus sandwicensis*), *āulu* (*Sapindus oahuensis*), *mēhamehame* (*Flueggea neowawraea*), *kalamona* (*Cassia gaudichaudii*), *alaheʻe* (*Canthium odoratum*), *ʻaʻaliʻi* (*Dodonaea viscosa*), *ʻawa* (kava; *Piper methysticum*), *ʻulu* (breadfruit; *Artocarpus altilis*), *kalo* (taro; *Colocasia esculenta*), *niu* (coconut; *Cocos nucifera*), *piʻa* (wild yam; *Dioscorea pentaphyila*), *kō* (sugarcane; *Saccharum officinarum*), *hoi* (bitter yam; *Dioscorea bulbifera*), *uhi* (common yam; *Dioscorea alata*), *ipu* (gourd; *Lagenaria siceraria*), *ʻōlena* (turmeric, *Curcuma domestica*), and *ʻuala* (sweet potato; *Ipomoea batatas*).

ʻEwa was known for a rare variety of *kalo* named Kāī O ʻEwa that was grown in mounds (*puʻepuʻe*) in the marshy lowlands of the ʻEwa District (Handy and Handy 1972:471). There were many sub-varieties of Kāī O ʻEwa: Kāīkeʻokeʻo, Kāīʻeleʻele, Kāīuliuli, Kāīʻulaʻula, Kāīkea, and Kāīkoi. Kāīkeʻokeʻo was said to be beloved by the chiefs for its unique aroma and flavor. Kāīkoi was known to spread out, quickly sending out *huli* (shoots) until it covered the entire *loʻi* (terrace). It was said that anyone who married someone from the area would never leave because the love of the Kāikoi was so strong (Pukui 1983:305).

The first *ʻulu* is claimed to have been planted at Puʻuloa by multiple *moʻolelo* and ethnographic accounts (Tuggle and Tomonari-Tuggle 1997:16). Although it is unclear if the breadfruit was planted in the wetter portion of Puʻuloa or the more arid Puʻuloa ʻIli region, an account by W.S. Lokai and recounted in Fornander (1919) described planting the *ʻulu* in a "large excavation" that Tuggle and Tomonari-Tuggle (1997) postulate might refer to a limestone pit:

> At Puuloa, Oahu. Its breadfruit plant came from Kanehunamoku, brought by two men of Puuloa who were out fishing and were blown off by a heavy wind and rain storm and landed at the uninhabited land, save gods only. Therefore by them it was introduced at Puuloa and planted in a large excavation where it grew and bore fruit, which they ate. Haumea and others afterwards knew of this breadfruit tree having been brought away secretly by these men, so she came to see it herself and made a visit to these islands, but this variety of tree was not found. That is the reason she scattered the breadfruit in all lands; hence its wide distribution. (W.S. Lokai in Fornander 1919:678)

The use of limestone pits as traditional planting venues is also suggested in mid-nineteenth-century Mahele documents by a resident of Puʻuloa ʻIli who recounted: "planting is done in hollows of rocks, and in *kaheka* [small brackish water ponds] and are scattered about at various places" (Native Register, Vol. 5, No. 6132:243–244; in Maly and Maly 2014:261).

In addition to agricultural uses, some of the limestone pits of the ʻEwa Plain have also been found to house paleontological deposits, cultural midden deposits, and burials (see Beardsley 2001, Spangler et al. 2020, Wickler and Tuggle 1997). The pits are typically "bell-shaped" in cross-section because of rainwater erosion that was more corrosive in the pit interiors due to a slower evaporation rate and mixing with groundwater (Ziegler 2002:97). They are often referred to in the literature as "sink holes," however this is erroneous as the pits were formed through gradual erosion rather than a collapse or "sink" of the ground surface (Hammatt and Shideler 1995:22-24). Limestone "pit caves," or simply "pits," are more accurate terms.

Limestone pit features, particularly those that contain paleoenvironmental data including now-extinct or extirpated avifaunal species, have provided significant insight into the environmental history of the ʻEwa Plain. Analysis of the vertebrate remains recovered from these deposits have led to the discovery of a range of now-extinct or extirpated avifaunal species (e.g, Athens et al. 1999, Athens et al. 2002, Davis 1989, Davis 1990, Dunn et al. 1991, James 1995). Similarly, fossil nonmarine mollusks from Barbers Point deposits identify 16 or more native terrestrial mollusk species that occupied the area prior to human arrival. This is followed by a sequence of replacement by Polynesian- and European-introduced taxa, as well as native taxa that were less sensitive to ecological disturbance (Christensen and Kirch 1986). Pollen analysis from sediment cores taken from the ʻEwa Plain (Ordy Pond) also indicate a dramatic transformation in the region's botanical composition at around this same time: disturbances in native forest cover rapidly give way to replacement by more open canopy flora (Athens et al. 2002).

More recent test excavations of a complex of 68 limestone pit caves (SIHP 50-80-12-07835) by Cultural Surveys Hawaiʻi, Inc. (Belluomini et al. 2017, Spangler et al. 2020) recovered additional faunal material, including cat (*Felis catus*), rat (*Rattus* sp.), pig (*Sus scrofa*), and numerous avifaunal remains including shearwater (*Puffinus* cf. *pacificus*), petrels (*Procellariiformes*), and potentially the tibiotarsus of an extinct or extirpated eagle (cf. *Haliaeetus albicilla*). SIHP 50- 80-12-07835 was evaluated as significant under criteria d and e. Community consultation highlighted concerns about potential burials and cultural resources in the limestone pits, a desire to see pits preserved as much as possible, and concerns over endangered bird species and federal restrictions. The potential discovery of now-extinct or extirpated faunal remains, and concerns expressed during community consultation, led to the preservation of 59 out of the 68 limestone pits at SIHP -07835. The remaining nine pits were previously disturbed and recommended for on-site monitoring (Belluomini et al. 2017, Spangler et al. 2020).

Trails

The trails documented by British Lieutenant Charles Malden (1825) likely show pre-Contact travel routes between significant resources and coastal and inland settlements of Honouliuli (Figure 54). These trails include a coastal trail that encircled the ʻEwa Plain, beginning at a settlement at the entrance to the waters of Puʻuloa, and three inland trails: one beginning at Honouliuli Village and ascending the southeast slope of the Waiʻanae Mountains though Kaloʻi Gulch and two *mauka-makai* (coastal-upland) trails aligned north and northwest (respectively) until merging into a single trail that ascended in a northeasterly direction to Honouliuli Village. A later 1899 map of Oʻahu Island (Beasley 1899)(Figure 55) shows a similar configuration of Malden's (1825; see Figure 54) coastal and *mauka-makai* trails labelled as roads.

The more western of the trails depicted by Malden appears to align with the lower half of current-day Coral Sea Road and continues in a straight direction beyond where Coral Sea Road curves to the west. This suggests that these possible pre-Contact trails were used during the nineteenth century and possibly improved with curbstones and ramps to make the pedestrian trails more easily navigable for horse travel (Apple 1965).

Hawaiian scholar John Papa ʻĪʻī describes a single trail crossing the northern edge of the ʻEwa Plain of Honouliuli and continuing northwest to Waiʻanae:

> At Pueohulunui was the place where a trail branched off to go to Wailua [north] and then down to Honouliuli [west] and on the Waianae. As mentioned before, there were three trails to Waianae, one by way of Puu o Kapolei, another by way of Pohakea, and the third by way of Kolekole. (ʻĪʻī 1959:97)

John Papa ʻĪʻī's Honouliuli trail follows a similar configuration as one of Malden's 1825 east-west inland trails and a later road crossing the ʻEwa Plain between Waiʻanae and the south coast of Oʻahu Island (Figure 56). A 1902 Oʻahu Island map also illustrates a new *mauka-makai* road that appears to intersect the project area and connects these upland roads with the Barbers Point Lighthouse (Figure 57). The road also appears to connect with an old "Oahu R.R." line and may be the "rough coral road" described by Dean (1991:20) that led from the Oahu Railroad and Land Company line to the Barbers Point Lighthouse.

3.2.5 Early Post-Contact Period

One of the earliest foreign accounts of Kalaeloa, now also known as Barbers Point, is by Captain George Vancouver, who led a voyage to Hawaiʻi in 1792. Of Kalaeloa, he wrote "this tract of land was of some extent but did not seem to be populous, nor to possess any great degree of fertility; although we were told that at a little distance from the sea, the soil is rich, and all necessaries of life are abundantly produced" (Vancouver 1798:361–363).

As part of the Vancouver Expedition, cartographer Lieutenant C.R. Malden produced a map of southern Oʻahu that included the southern portion of the Waiʻanae Mountains, the bays of Puʻuloa and all of Honouliuli's ʻEwa Plain (Malden 1825; see Figure 54). Malden's 1825 map labeled the ʻEwa Plain as a "low uncultivated plain" and drew a network of coastal and inland trails crossing the plain. Small settlements are suggested by clusters of rectangular structures along the southern and eastern coastline. The village of Honouliuli, shown in the northwest corner of the bays of Puʻuloa (West Loch), was likely the most populated post-Contact settlement in Honouliuli. Malden's map also shows a grid of rectangular structures and a "Watering Place" at Honouliuli Village.

The post-Contact name for Kalaeloa, Barbers Point, comes from Captain Henry Barber, whose ship, the *Arthur*, ran aground there.

> In October 1796, a ship went aground at Kalaeloa, Oahu. This ship had visited the island on several occasions during the rule of Ka-lani-ku-pule. This was the first time a foreign ship had grounded on these shores. Kamehameha was on Hawaii, but Young had remained on Oahu. All the men on the ship came ashore at night in their boats. At daylight when the ship was seen ashore Ku-i-helani placed a ban on the property of the ship and took care of the foreigners. Hawaiian divers recovered the valuables, and they were given over to the care of

> Ku-i-helani, but part were given by Captain Barber to the men who had recovered them. (Kamakau 1991:174)

Captain Barber was a fur trader on his way from North America to Canton [Guangzhou]. He had planned to stop on Kauaʻi to pick up a supply of yams when his ship got caught in the swell near Kalaeloa and smashed into the rocks. As Dean (1991) notes, the wreck of the Arthur was the first recorded wreck of a European ship in the Hawaiian Islands that also claimed human lives: although Barber survived, six of his 22-man crew perished.

With foreign arrivals also came foreign diseases like smallpox, cholera, and measles, broadly referred to as "the plague" (Lewis 1970:9). In Honouliuli, as it was across the archipelago, introduced diseases rapidly and drastically reduced the Native Hawaiian population. A missionary census from the 1820s recorded a Native Hawaiian population residing in the ʻEwa District of 1,026 people. However, by the 1831–1832 census, this population had declined to 870 people, amounting to a 15% decline of the population within four years (Kelly 1991:157).

According to Lewis (1970), L. Smith, the first missionary to build a church in ʻEwa, had called the people of Ewa a "dying people," and estimated eight to ten deaths for every birth (Lewis 1970). The Protestant missionary who succeeded Smith in ʻEwa, Artemas Bishop, observed that:

> The people of the district are rapidly diminishing, and whole neighborhoods where in former years were numerous families and cultivated lands, there are now no inhabitants, and the land is left to run to waste. The fathers have died off, and the children wander into other parts, and there are none to fill their places. (Bishop 1854)

After traversing much of the island of Oʻahu in the early 1800s, Edwin Hall, Hawaiian Minister of Finance, described west ʻEwa as a "barren, desolate plain" (Hall 1839 as cited in Lewis 1970:8).

Kamakau (1961) observed: "Honouliuli had over ten school houses with their teachers. The lowest number of pupils to each school was 50 up to 200 or more. Oahu was then thickly populated. It is sad to see how in so short a time whole villages have vanished leaving not a man…" (Kamakau 1961:424-425).

Wilkes (1845) observed a warm reception by Reverend Bishop, and noted that within ʻEwa, "There are no chiefs or any persons of distinction residing in this district; the people are labourers or Kanakas, and the landholders reside near the king at Lahaina, or at Honolulu. The taxes and occasional levies without any outlay have hitherto kept them poor" (Wilkes 1845:84-85). He went on to describe ʻEwa as having soils of a hard, red clay ("deemed useless except for pasturage"; Wilkes 1845:86), plentiful springs and streams, which kept the sugar mills and taro patches well supplied in fresh water, and the "calcareous sandstone" of the ʻEwa Plain, which he noted had resisted any attempts to convert to lime. He observed that ʻEwa was the best part of the island for raising cattle and sheep, and that they were found in larger numbers there than anywhere else on Oʻahu. His description of the day-to-day for ʻEwa's Native Hawaiian population in 1840 emphasized the sugar mill, trade work, and an increased influence of European styles:

> …there is a sugar-mill which, in the season, makes two hundred pounds of sugar a day. They have been taught, and many of them are now able to make their own clothes, after the European pattern. There is a native blacksmith and several native carpenters and masons, who are able to work well. (Wilkes 1845:86)

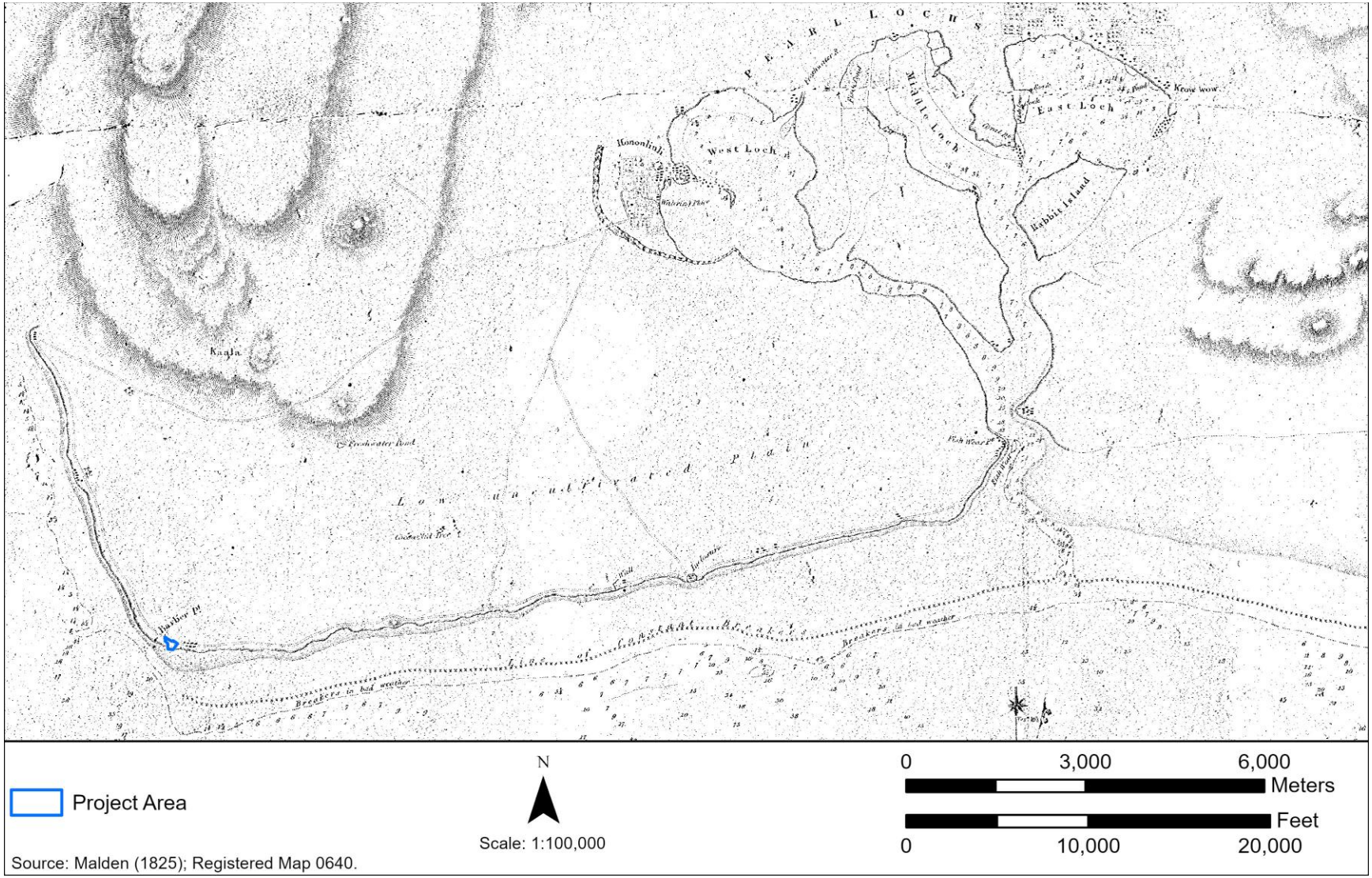


Figure 54. An 1825 map by Lieutenant C. Malden shows the Oʻahu portion of the HIFL project area located in the "uncultivated plain" of ʻEwa, with early post-Contact trails traversing the coastline and extending *mauka-makai*.

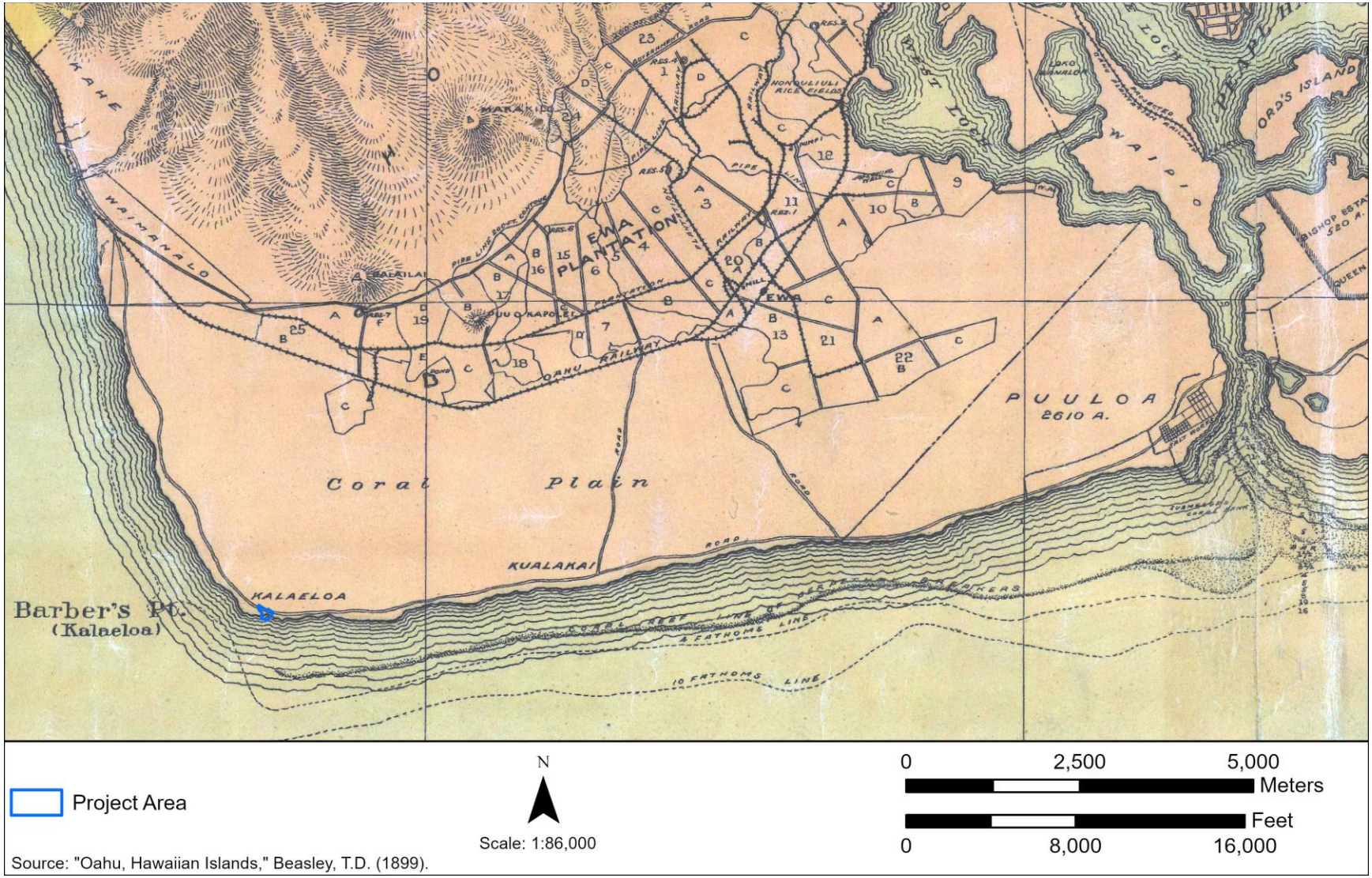


Figure 55. An 1899 map by T.D. Beasley showing the Oʻahu portion of the HIFL project area located in the area labeled "Coral Plain" with the trails depicted in Figure 54 now indicated as developed roads.



Figure 56. A 1959 map by Paul Rockwood depicting the trails of leeward Oʻahu as described by John Papa ʻĪʻī.



Figure 57. Portion of a 1902 Hawaii Territory Survey Map of Oʻahu Island showing plantation boundaries, early twentieth-century land use features, and a new *mauka-makai* road connecting the Barbers Point Lighthouse to the uplands.

3.2.6 The Mahele

During the Mahele, the entire *ahupuaʻa* of Honouliuli was awarded to Miriam Keʻahikuni Kekauʻōnohi, granddaughter of Kamehameha I and heir of Kalaniomōkū (Yucha et al. 2015:26). Upon her death in 1851, her lands were transferred to her husband, Levi Haʻalelea. In 1864, the land was passed on to Haʻalelea's second wife and widow Anadelia Amoe and subsequently to her brother-in-law John H. Coney (Yucha et al. 2015:26).

Maly and Maly (2014:253–509) conducted extensive research of the Honouliuli land claims and provide a complete list of the LCA claimant names, associated place names, land uses, and cultural features cited in the Land Commission testimonies. According to Maly and Maly (2014:248), of a total 106 native claims made for Honouliuli, 74 were awarded as Land Commission Awards (LCAs), 33 were denied and the status of the remaining native claim is not given (or the correct number of denied claims is 32).

Most of the Honouliuli LCAs were awarded to claimants for parcels along Honouliuli Stream at its juncture with the waters of Puʻuloa or West Loch area of Pearl Harbor, far from the project area. These claims, covering a roughly 287-acre area, are shown on an 1878 "Map of Honouliuli Taro Land" (Monsarrat 1878)(Figure 58). Monsarrat's 1878 map shows the distribution of LCAs with the stream at the center and the presence of two churches, a schoolhouse, and a parcel with multiple structures in J. Campbell's name. No other Honouliuli maps with LCA locations were identified through archival research.

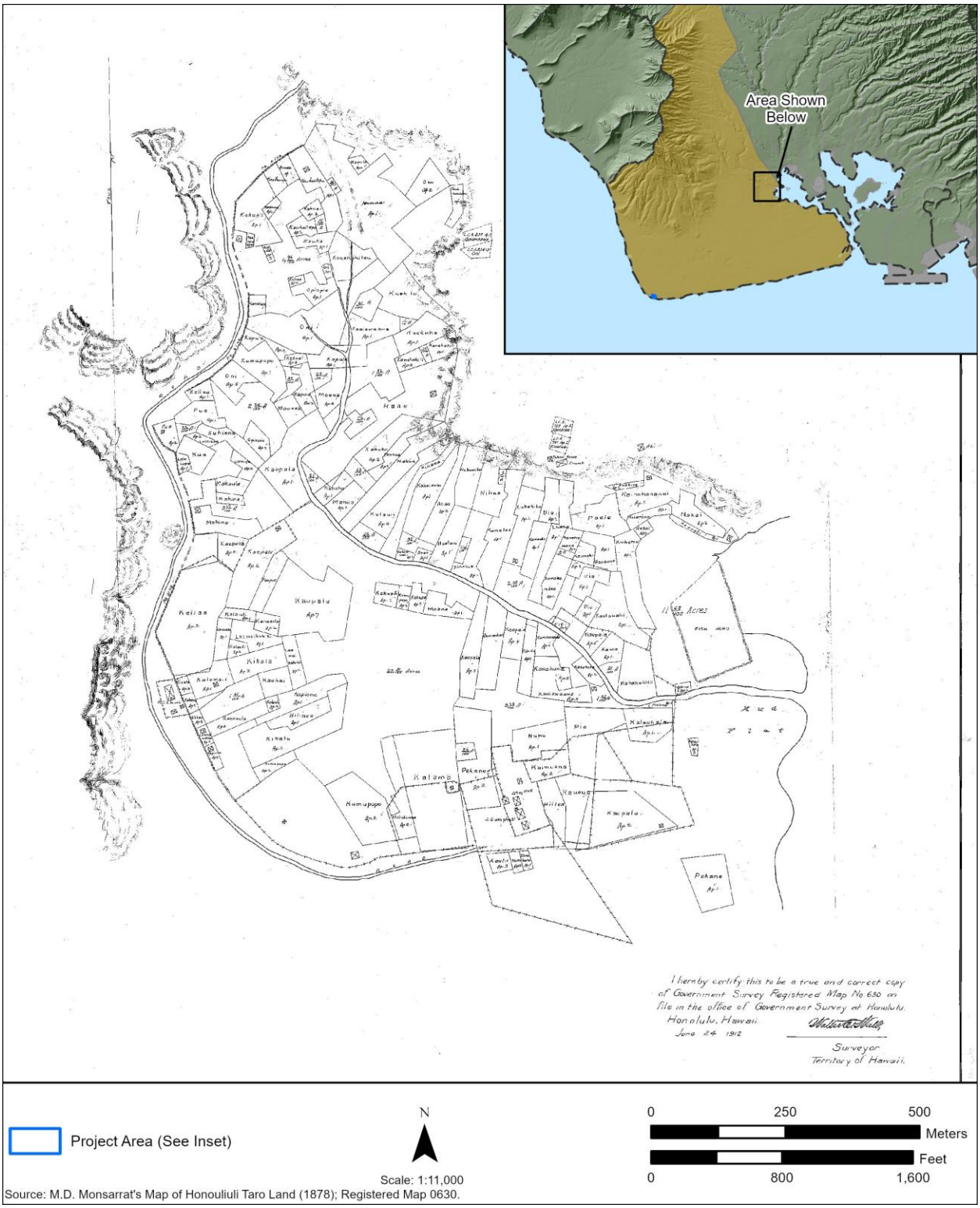


Figure 58. Map of LCAs, Land Grants, and other post-Contact features in Honouliuli Ahupuaʻa identified through archival research.

3.2.7 Honouliuli Ranch

After Levi Haʻalelea passed on, his widow Anadelia Amoe inherited the Honouliuli lands and rented them to James Dowsett and John Meek for stock running and grazing in 1871 (Frierson 1972). According to the journal of Lloyd Vernon Briggs, a medical student who visited Oʻahu in 1880 and 1881, James Campbell purchased the 41,000 acres of Honouliuli Ranch from J.H. Coney in 1877 for $95,000. At the time of the sale, there were around 32,300 head of branded cattle, which Campbell drove off and replaced with his own herd (Briggs 1926). Shortly thereafter, the industrious Campbell also began leasing out rice lands, the fishing rights at Pearl Harbor, and a lime quarry (Lewis 1970).

Briggs noted that Mr. Campbell was the source of most of Honolulu's supply of meat: cattle intended for the slaughterhouse were brought there to fatten, and he estimated roughly six head were slaughtered per day to supply the Honolulu markets. He noted there were "at least 5000 head of Durhams, Herefords, Jerseys, Ayrshires and Holsteins, besides horses and mules. Mr. Campbell has 42,000 acres here, of which 10,000 are adapted to agriculture" (Briggs 1926:65). Haun (1991) noted that the *kiawe* (mesquite; *Prosopis pallida*) growing in the ranch would have proven useful in multiple ways, with the beans provided food for cattle, and the wood making excellent charcoal (Haun 1991:162).

In 1879, Campbell imported a well-driller from California and bore 250 feet into the earth where "a sheet of pure water flowing like a dome of glass from all sides of the well casing" gushed forth (Campbell, The Estate of James 2003). The first artesian well was opened in Honouliuli in 1879 (Campbell, The Estate of James 2003). With the discovery of water and the presence of a new fence, Campbell opened Honouliuli Ranch in 1881 and focused his efforts on cattle ranching (Campbell, The Estate of James 2003). An 1881 map of a portion of Honouliuli by Monsarrat depicts the project area and surroundings around the time the ranch first opened (Figure 59).

Campbell restocked the ranch, starting with 1,100 heads of cattle and eventually building up to 5,500. Frierson (1972) notes that the coral plains were grazed, and sugar was grown in the area between the plains and the mountains. An 1873 map of Honouliuli by Alexander highlights the government road in *mauka* Honouliuli (Figure 60).

Briggs described his visit to Honouliuli Ranch on January 9, 1881:

> Ewa has a spacious and deep harbor, which is rendered almost useless by a coral reef. I took a ride over the Honouliuli Ranch which is quite romantic. The soil is a deep, reddish loam, up to the highest peaks, and the country is well-grassed. Springs of water abound. The *ilima*, which grows in endless quantities on the plains of this ranch, is considered excellent for feeding cattle; beside it grows the indigo plant, whose young shoots are also good fodder, of which the cattle are fond. Beneath these grows the *manienie* grass, and Spanish clover and native grasses grow in the open; so there is abundant pasturage of various kinds here.
>
> As I rode, to the left were towering mountains and gaping gorges; ahead, undulating plains, and to the right, creeks and indentations from the sea. A wide valley of fertile land extends between the Nuuanu Range and the Waianae Mountains and thence to the coast of Waialua. There are many wild goats in this valley, which are left more or less undisturbed because they kill the growth of mimosa bushes, which would otherwise overrun the country and destroy the pasturage for cattle. These wild goats were found on the island by the earliest navigators. Royalty alone hunted them in the early days, one person sometimes taking

> several hundred in a day. They chased them on horseback. Clinging by his legs around the belly of the horse, the rider swung his body over one side, while the horse was going at full speed, reached down and grabbed the goats by the hind legs, one after another, breaking the legs by a sudden expert movement, and leaving the victims to be dispatched by attendants who followed close behind. (Briggs 1926:62-63)

By 1929, the Honouliuli lands encompassed approximately 23,000 acres of pasture lands of varying quality, and continued to serve as the fattening area for the other ranches. Lower lands were noted to have abundant algaroba trees, also known as mesquite in the southwestern United States and Mexico, and better known in Hawai‘i as long-thorn *kiawe* (*Prosopis juliflora*).

By 1904, *kiawe* forests covered 20,000 acres along a narrow, nearly continuous band of the southern and western coasts of O‘ahu (Hall 1904). The wood from the *kiawe* forests was a valuable resource, as it supplied a large quantity of fuel necessary for processing the massive amounts of sugarcane that were now being produced, as well as a reliable construction material for homesteads, railroad ties, and fenceposts (Frierson 1972). According to Hall (1904), the first long-thorn *kiawe* tree in Hawai‘i was from a seed planted in 1837 at the corner of Fort and Beretania Streets in Honolulu by Father Bachelot, the founder of the Roman Catholic mission. This tree became the progenitor of at least 50,000 acres of *kiawe* forest across the islands. During this time, *kiawe* forests were considered a valuable asset whose wood and seed pods could be put to a variety of uses such as fuel, fence posts, and stock feed. A symbiotic relationship developed between the *kiawe* forests and animals introduced for ranching: not only did the *kiawe* forests provide a significant source of food for cattle and other stock animals, but these introduced domestic fauna played a key role in promoting *kiawe* forest expansion through both eliminating competing vegetation and dispersing digested *kiawe* seeds across the expansive ranchlands. So significant was this relationship that Hall (1904) attributed the introduced ranching fauna as solely responsible for the rapid and widespread abundance of *kiawe*.

Henke observed: “During the rainy seasons native weeds afford good pasturage but during the dry season algaroba beans and Klu (*Acacia farnesiana*) are the principal feeds” (Henke 1929:64). Hencke (1929) also recorded that the Honouliuli portion of the ranch had about 100 Duroc Jersey hogs, and was the site of the ranch headquarters and slaughterhouse. Aerial imagery from 1927-1928 shows the dense *kiawe* forests in the *makai* portion of the project area, and cultivated sugarcane fields in the *mauka* portion (Figure 61).

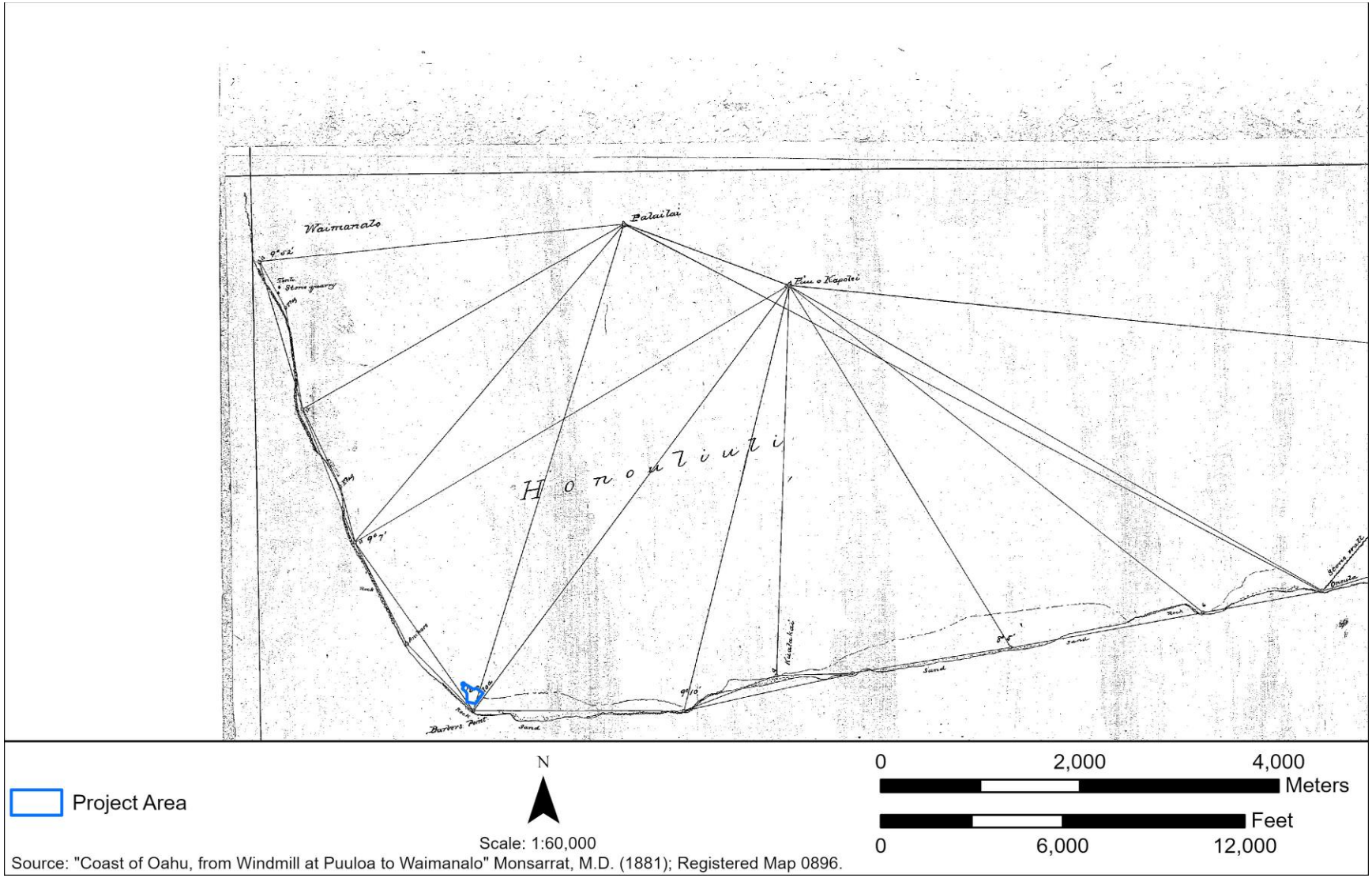


Figure 59. An 1881 map by M.D. Monsarrat, showing Kalaeloa re-named as "Barbers Point," located in the same area as the Oʻahu portion of the HIFL project area.

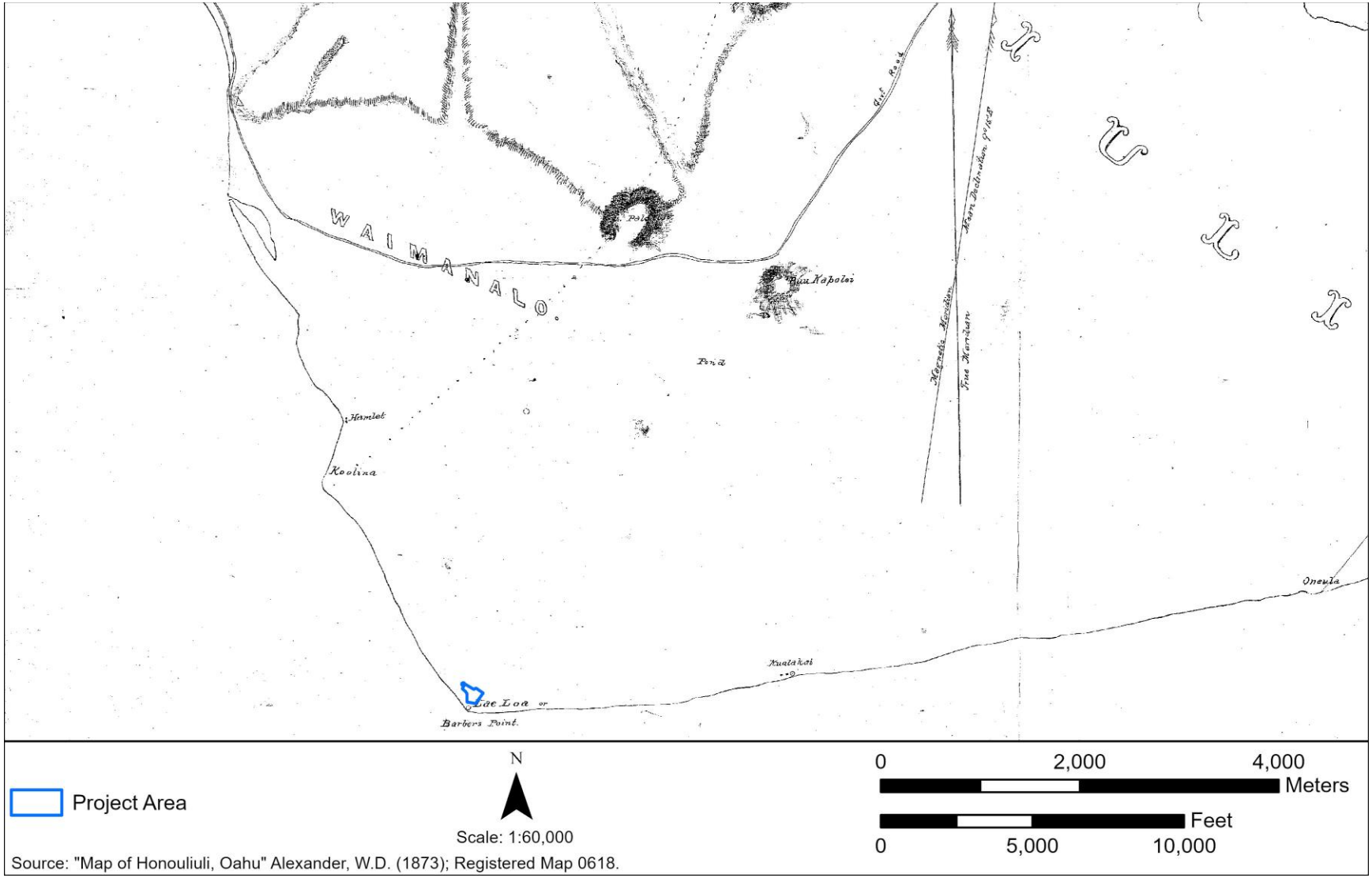


Figure 60. An 1873 map by Alexander shows the "Govt. Road" running along the *mauka* portion of the ʻEwa Plain and the Oʻahu portion of the HIFL project area located at Kalaeloa, labeled "Lae Loa or Barbers Point."



Figure 61. A composite of 1927-1928 Army Air Corps aerial images show the dense *kiawe* forests in the Barbers Point area during this time, as well as Ewa Plantation fields under cultivation to the north.

3.2.8 Ewa Plantation

The Ewa Plantation Company was established in Honouliuli in 1890, after the sub-subletting of more than 11,000 acres of land from B.F. Dillingham, to Castle, then to Ewa Plantation Company (Campbell 1994). The leases and other documentation mention some of the resources contained on the property, which included "ridge land, pasture, a wood lot at Waimanalo, bee-keeping and garden crops," as well as two limestone quarries on the coral flats, one near Waimānalo and one near Barbers Point (Frierson 1972:5).

By 1899, Ewa Plantation had an operational mill and over 2000 acres in sugarcane cultivation (Frierson 1972). By 1913, the plantation had expanded over much of the northern half of the ʻEwa Plain (Figure 62). By 1931, it was known as one of the most prosperous plantations in the Hawaiian Islands and, by the 1930s, most of the eastern half of Honouliuli was plantation land (Yucha et al. 2015:37). A 1939 map of the Ewa Plantation Co. illustrates the numerous subdivided agricultural plots and a U.S. Army road extending along the coast to the project area (Figure 63.). In 1970, Oahu Sugar Co. took over ownership of Ewa Plantation and continued its operation until 1995.

In the early 1900s, the Ewa Plantation operators began installing a system of drainage ditches that ran from the lower slopes of Honouliuli into the lowlands, in order to wash soil from the slopes into the plain and "reclaim" parts of the coral plain. Just before the rainy season, the hill slopes would be plowed vertically to induce soil erosion. At least 373 acres were reportedly claimed this way in a matter of years, though notably, this "gullying and soil removal" process had already been underway as a natural effect of removing vegetation (Frierson 1972).

Beekeeping was a commercial activity in the ʻEwa Plain between the late 1800s and early 1900s and various lease documents for the *ahupuaʻa* identified bees as one of the Ewa Plantation's assets in 1920 (Tuggle and Tomonari-Tuggle 1997:11).

Amateur historian John Bond described honey production on the ʻEwa Plain as follows:

> The Ewa Kiawe honey production industry also included many independent operations as well as the Hawaiian Honey Company. Incorporated in 1901, HHC was located along the Oahu Railway in Ewa, west of Ewa Mooring Mast Field, and managed approximately eighteen hundred colonies of hybrid bees, yielding some180,000 pounds of honey annually and shipping fifty to sixty tons of honey and wax from Honolulu each year. Honey Bees today remain one of the most important links in the ecological food chain and the Ewa Field park will have honey bees as a key park natural resource as well as preservation of the Karst caves and sinkholes. (J. Bond, Ewa Field – MCAS Ewa Historic World War II Memorial Park – American Veterans Hawaii [amvetshawaii.org])

Sisal (*Agave sisalana*) was imported from Florida in 1893 for cordage, and cultivated in the area southeast of Puʻu o Kapolei starting in 1894 (Kelly 1991:162). This cultivation was expanded during the early twentieth century under the Hawaiian Fibre Company, who had two primary plantations, one in Waipahu and the other on the ʻEwa Plain among "disintegrated coral" not deemed optimal for sugar cultivation (*Paradise of the Pacific*, in Yucha et al. 2015, Tuggle and Tomonari-Tuggle 1997). The Hawaiian Sisal Co. continued sisal production on Ewa Plantation lands from 1898 until the 1920s (Frierson 1972). By 1918, it was claimed that sisal was the most extensively used fiber in the U.S. The sisal cultivated in Hawaiʻi was shipped mainly to San Francisco, New York, and Japan (Kelly 1991:165). The 1902 map of Oʻahu by Donn and Wall shows a large sisal plot between the Ewa Plantation lands and the coral plains, to the east of the project area (see Figure 57).

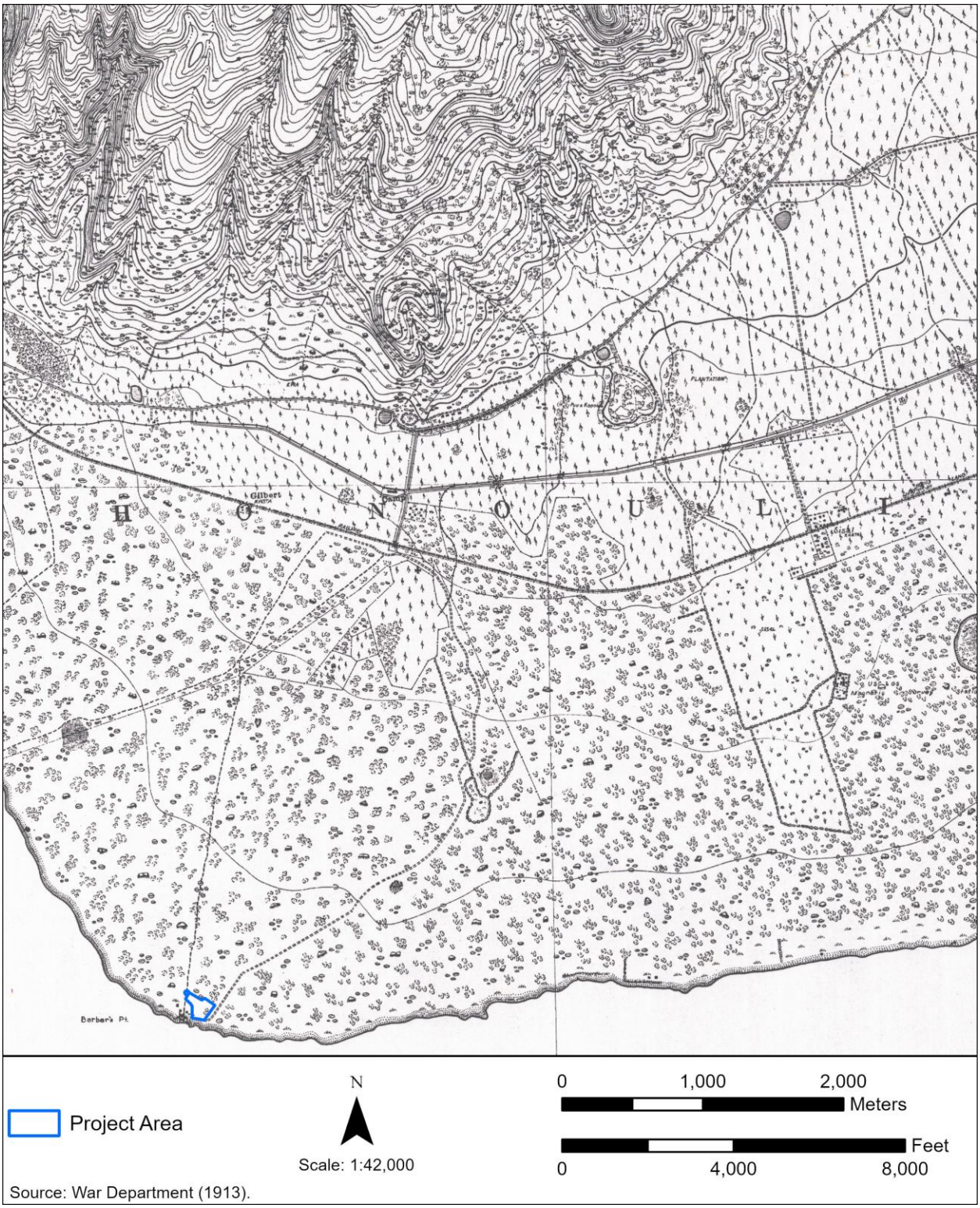


Figure 62. A 1913 military survey map showing the Ewa Plantation expanded over much of the northern half of the ʻEwa Plain; the Oʻahu portion of the HIFL project area is located at the intersection of two *mauka-makai* trails.

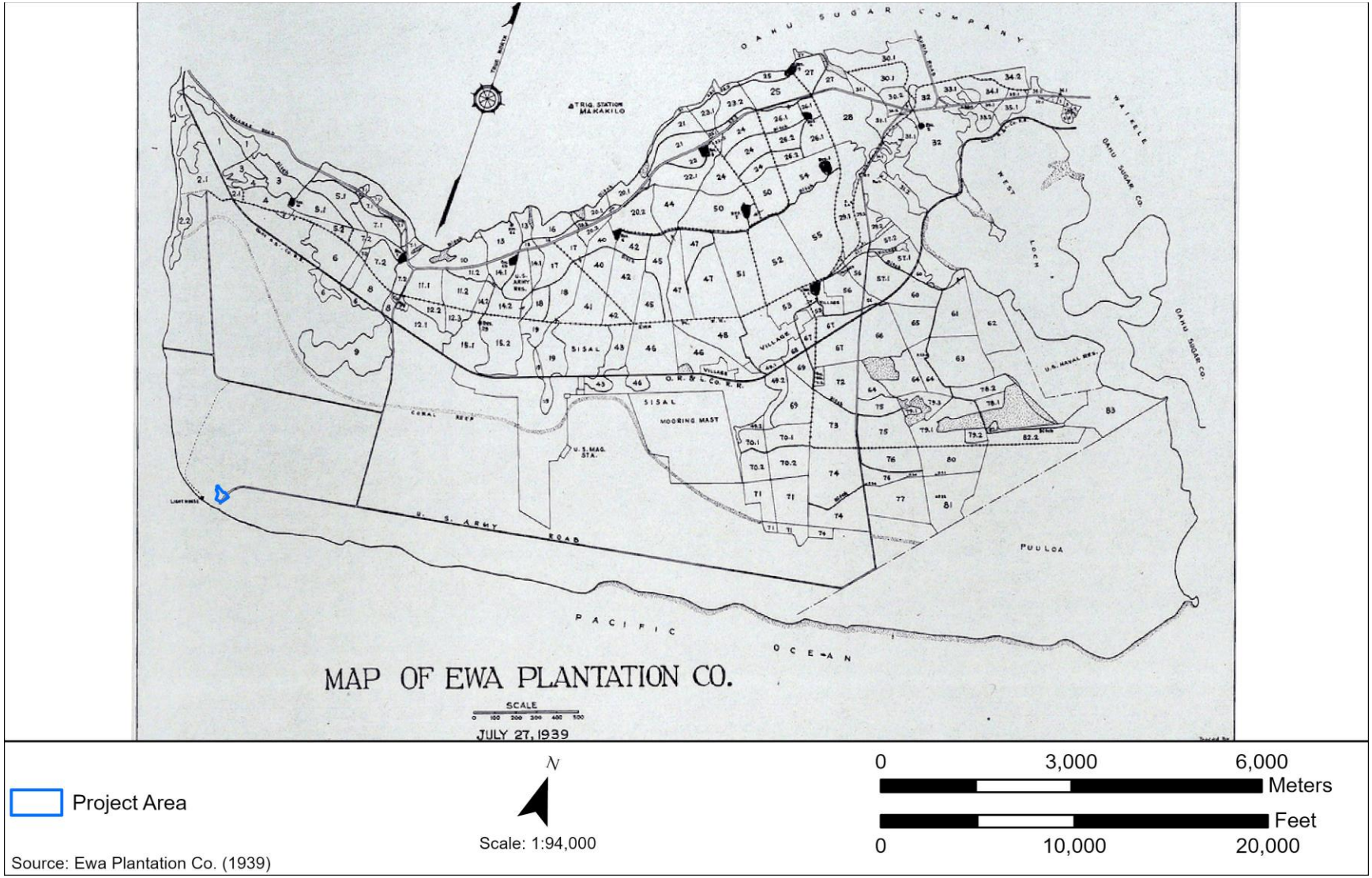


Figure 63. A 1939 Ewa Plantation Co. map provides a visual of the extent of the Ewa Plantation Co., which expanded over much of the northern half of the ʻEwa Plain.; the Oʻahu portion of the HIFL project area is located at the western terminus of a U.S. Army road..

3.2.9 The Oʻahu Railway & Land Company

Between 1885 and 1886, Campbell worked with B.F. Dillingham to develop small tracts of agricultural lands and homesteads in Honouliuli in what Thrum referred to as the "Great Land Colonization Scheme" (Thrum 1886). Their aim was to sell roughly 10,000 acres of homestead and agricultural land in lots sized between 10 and 100 acres, at $50 per acre, "for colonization purposes" (Thrum 1886:75). The parcels were to be sold under a 10-year installment plan, the terms of which included that the land would be fenced "with a good substantial fence" (Thrum 1886:75) and the owner would build a suitable house for themselves on the lot within six months of the sale. Within a period of two years, they also required that at least 10 fruit and other trees per acre were planted. The 1886 description of the scheme cast the Honouliuli Ranch lands in a favorable light:

> This land is favorably situated, having direct communication with Honolulu by water, distance 10 miles, or by land by a good road, distance 17 miles, the latter offering singular facilities for an inexpensive railway track. The water route to Honouliuli is from Honolulu harbor skirting the reef to pearl harbor, a magnificent inlet of the ocean protected by a reef or bar with 11 to 13 feet, but inside with from 20 fathoms to 3 fathoms of land-locked, protected anchorage, fit for all classes of coasters and yachts…
>
> …where Honouliuli adjoins the neighboring properties, it is securely fenced. There are twenty miles of five wire fence with redwood posts, and ten miles batten fence, all in good order and erected within the last seven years.
>
> Stretching from Pearl harbor and skirting the base of Waianae mountains southward and eastward is a plain of about 7,000 acres of rich alluvial soil, eminently suitable—the upper portions for sugar and the lower for rice lands. Of these latter, from 3,000 to 4,000 acres may be irrigated by artesian wells, the elevation above high water mark being between 12 and 35 feet. A well sunk on this property in 1881, to a depth of 186 feet, has yielded unceasingly 2,400 gallons per hour since completion. Wells have been sunk at elevations from 400 to 700 feet about the sea level. Water was found at from 30 to 60 feet below surface. One is a flowing well; on the other a windmill suffices to raise drinking water for surrounding herds. The ravines of the Waianae slope are narrow wand readily lend themselves to favoring the construction of storage dams for purposes of irrigation. On the eastern slopes, among the foothills of the Waianae mountains are over 10,000 acres of land, suitable for smal [sic] arms, vineyards, orchards, &c…
> (Thrum 1886:74-75)

The description goes on to tout the abundance of perennial springs in the valleys and ravines, and past taro cultivation as evidence for abundant water. At the time, the sugar and rice lands were valued at $100-200 per acre, and the grazing and orchard lands were valued from $10-50 per acre.

The venture met with little success, likely in part due to the distance between Honouliuli and Honolulu. Consequently, in 1888, Dillingham and Campbell partnered to develop a railway system through the area, in what Thrum subsequently called the "the Colonization and Railroad scheme of Mr. B.F. Dillingham" (Thrum 1887:74), and what others called "Dillingham's Folly" (Hungerford 1963:8). Campbell had offered to sell 56,000 acres in ʻEwa and Kahuku to Dillingham, but they ultimately settled on a 50-year lease when Dillingham was unable to come up with the funds needed to purchase (Chiddix and Simpson 2004, Frierson 1972). In 1889 Dillingham signed the lease and formed the Oahu Railway & Land Company (OR&L).

Building on Kalākaua's 1878 Act to Promote the Construction of Railways, which had already seen the development of passenger railroads on Maui and Hawai'i Island, in 1888 the legislature voted to approve Dillingham's franchise for a proposed new railroad. The charter allowed for 20 years of operation and required that the steam railway be operational between Honolulu and Pearl Harbor (then known as the Pearl River Lagoon) within three years, with no government subsidies (Chiddix and Simpson 2004). To save costs, Dillingham opted for the three-foot wide narrow-gauge track, rather than the 4'8.5" width standard gauge that was used for long haul railroads in the U.S. The rails were ordered from Germany, and the labor completed mostly by migrants from China.

Much of the OR&L permanent right-of-way was heavily ballasted by coral rock, and according to Lewis (1970):

> Miles of this coral roadbed are still visible on the coral plain, and where the railroad passes less than 200 feet from the robbed east end of our "Long Wall" it is hard not to believe that the ballast contains the crushed remains of many a house foundation, ancient wall, or even heiau. (Lewis 1970:16)

On King Kalākaua's birthday (November 16, 1889), the railroad opened and gave over 4,000 passengers a free 18-mile round trip ride. In 1890, OR&L's railroad was running from Honolulu to Pearl Harbor. In 1892, the first Ewa Plantation sugar crop was carried. The expansion of the railroad paused shortly after this. Hungerford (1963) speculated this was due to the political turmoil of the ensuing years, which saw Lili'uokalani ascend to the throne followed by the overthrow of the Hawaiian Kingdom and the installation of a provisional government and republic under the presidency of Sanford Dole. In 1895, expansion of the railroad continued across the entirety of the 'Ewa Plain and into Wai'anae.

Dillingham established five ranches along his proposed railway line, all under the banner of the Oahu Railway and Land Company Ranches. There were ranches in Honouliuli, Nanakuli, Mokulē'ia, Kawailoa, and Kahuku. Harry M. Von Holt became the first ranch manager in 1890, and introduced the Shorthorn breed of cattle shortly thereafter, as they were known to be "good hustlers" and good for both dairy and beef (Henke 1929:63).

The romantic picture of abundant springs and limitless artesian wells painted by Thrum's Almanac just a few years earlier may have been overstretched. Ida Elizabeth Knudsen Von Holt, wife of Harry Von Holt, described the struggle with finding sufficient water to maintain the herd:

> In the early days of the Ranch Department of the Oahu Railway & Land Co., of which Harry was Superintendent, the outstanding need for water for the stock, as the year before the ranches were taken over by the railway company a thousand head of cattle had died from want of water. Harry's first thought when out riding over the country was where to find water, and during the years 1890-91-92 much was done in the way of new troughs, getting water from the plantation flumes, and digging out wet places that showed any prospects of water. One of those places is on the old trail to Palehua, and had evidently been a place of which the Hawaiians had known, for its name is Kaloi (the taro patch), and even in dry weather water would be standing in the holes made by the cattle, as they tried to get a drop or two. (Von Holt 1985:136)

In an interview with Ernest Lewis, Herman V. Von Holt, a descendant of Harry Von Holt, provided his recollections of the OR&L Ranch:

> Only two Hawaiian cowboys ran the whole thing. The kiawe was too thick for herding cattle, so they built walls and fences around the water holes. When they wanted some cattle, they closed the gate and trapped them at the water. Then they ran them through all the way to the slaughterhouse at Honouliuli, through the cane fields.
> (Von Holt interviewed in Lewis 1970:15)

Von Holt also identified a shrimp pond in the vicinity of Barbers Point, and described the fishermen who would squat in shanties along the shore, trading fish for taro and drinking water from ponds "so brackish that other people could not bear to drink it" (Lewis 1970:15).

During World War II, OR&L began running day and night to shuttle troops, workers, supplies, and ammunition across the island. From 1941 to 1943, the annual OR&L passenger total exploded from under 1 million to 2,642,516. Old, discarded train coaches were brought back into commission to keep up with the volume, even those "from which seats had been removed and sliding side doors installed for use in conveying new cans from the American Can Co. factory to the pineapple canneries" (Hungerford 1963:34). There were times when a new train would arrive from Pearl Harbor and Barbers Point to Honolulu every 5 minutes. An Army Connecting Railroad was built as an alternate route in case the OR&L tracks were destroyed by enemy action, but it never became necessary (Hungerford 1963).

After the war, operations slowed and revenues shrank by 55%. Heavy wear on locomotives, tidal wave damage to the tracks, and increased short-haul competition from trucks placed significant pressures on OR&L. In 1947, B.F. Dillingham's son Walter reluctantly applied for permission to abandon 81.2 miles of railway and close down operations outside of Honolulu. In 1950, Congress approved the sale of 30 miles of the OR&L track and right-of-way, extending from Pearl Harbor to the Lualualei ammunition depot, to the U.S. Navy for $1. This action preserved much of the original line through ʻEwa and Nanakuli. A 1951 aerial image shows the OR&L Railroad right after this sale to the U.S. Navy (Figure 64).

3.2.10 The Barbers Point Lighthouse

Henry Barber's ship, *Arthur*, may have been the first Western ship to run aground at Kalaeloa, but it would not be the last. Notably in 1855, the French whaleship *Marquis de Turenne* ran aground at Barbers Point after departing from Honolulu Harbor (Dean 1991). By this time, it has become clear that Barbers Point posed a hazard to seafarers and should be marked in some way. In 1880, William Dewitt Alexander was tasked with surveying the area to determine the best location for a lighthouse. His description of these efforts is reprinted in Dean (1991):

> I examined the coast for some miles in the neighborhood of Barber's Point, selected a site for a light house and marked the spot by a pile of stones and a staff with a red and white flag. I also fixed the position by triangulation and corrected our chart of that locality. It is the SW point of Oahu, known as Lae loa where there are several pieces of…the French whaleship *Marquis de Turenne*, which was wrecked about a mile off the point in 1855. A shoal with only 6 to 10 feet of water on it is said to extend 2 or 3 miles south by west from the point, and it should be sounded. In fact it is a question whether the light house might not be placed on a shallow spot or "okohola" whale's back, as the natives call it, a mile or more offshore. The best guide is old Moke, who lives in Honolulu not far from the Catholic Church and ought to accompany the sounding party. The best landing place in the neighborhood is at Koolina about 2 miles N.W. of the point under the lee of the land…Distance to Honolulu light house about 14 nautical miles." (Alexander 1880 in Dean 1991:18)

An 1873 map by Alexander (see Figure 60) shows the point, labeled "Lae Loa, or Barbers Point," to the south of the project area.

With Alexander having found the appropriate spot for the lighthouse on Barbers Point, in 1880 funds were appropriated for its construction. Unfortunately, due to shipping complications, these funds were exhausted before the lighthouse could be built and plans were postponed. Finally in 1887, funds were once again made available for lighthouse construction. James Campbell deeded roughly ½ acre at Barbers Point to the government for the lighthouse. A. Alona was appointed as the first lightkeeper in 1888 and paid $20 per month for the job (Dean 1991).

By 1904, the light station site had expanded to encompass two acres. By 1910, three more acres were added:

> An assistant keeper's dwelling stood close to the light tower, and a separate oil house had been built. At the edge of a thick growth of *kiawe* (algaroba) trees were the keeper's dwelling, a storeroom and barn, the laundry and the water tank.
>
> Kiawe, which grew abundantly throughout the light station acreage and beyond, was considered to be one of the most valuable trees introduced to Hawai'i, providing both animal fodder and firewood. Barbers Point was a major source of firewood for Honolulu after 1880, and there was continuous logging of the kiawe trees in the lighthouse area. (Dean 1991:20)

In 1915, a new lightkeeper's dwelling was built on the property, and over 3.5 miles of one-and-a-half inch pipes were laid to provide indoor plumbing to the site. Dean (1991) described an inspection visit from Frederick Edgecomb, a Lighthouse Service engineer, in 1916:

> He reached Barbers Point by traveling on the Oahu Railroad and Land Company train to "Gilbert Number 2" and then walking three miles along a rough coral road to the light station. The nearest post office was six miles distant at Ewa Mill. The station was fenced in; on the property, besides the light tower, there was a concrete oil house, a two-room storehouse, and two keepers' dwellings. The buildings were painted brown with white trim and had brown metal roofs. The keepers had recently whitewashed the tower, and Edgecomb reported that the station was well maintained. (Dean 1991:20)

According to Dean (1991), only two significant ship groundings have occurred since the lighthouse was established. The first was the *Sheridan*, an Army transport ship from Manila, which struck uncharted coral reef off Barbers Point in 1906. All 132 passengers were brought ashore, and all of its freight had to be offloaded, with tons of coal dumped overboard, before the *Sheridan* could be hauled off the reef. The second was the *West Eldura*, a cargo ship transporting sugar from Manila to New York, which ran aground in 1920 (Dean 1991).

By 1930, the lighthouse was showing signs of deterioration, and in 1933, funds were allotted to build a new reinforced concrete tower (Figure 65). The old tower was easily toppled, and in the words of Dean (1991): "Workmen cut into the soft coral foundation, in the same way a tree is felled, and the last of the old Hawaiian lighthouses crashed to earth" (Dean 1991:23). The new light proved useful not just for ships, but for airplanes landing in the Barbers Point Naval Air Station as well. In 1964, the new lighthouse was made automatic and no longer required a lightkeeper. As the Barbers Point industrial complex sprawled in the late 1980s, the lighthouse's former acreage diminished to a chain-link fence around "a small bit of rock and dry grass around the light" (Dean 1991:24).



Figure 64. A 1951 USGS aerial photo which shows the OR&L Railroad (upper right corner) and military features shortly after WWII.



Figure 65. A 1937 photograph of Barbers Point, titled "Barbers Point, Road West Side, Oahu, T.H.," looking towards Pearl Harbor, showing the newly constructed concrete lighthouse (orange arrow), the U.S. Army Road, and the vast expanse of *kiawe* forest on the Honouliuli plains (U.S. National Archives and Records Administration 2025).

3.2.11 U.S. Military Occupation

There was a major shift in land use in Honouliuli from agricultural to military in the late nineteenth century, as interest grew from the U.S. to utilize the islands as a geographically strategic base. Although the primary focus was the lochs of Puʻuloa, the adjacent plains of ʻEwa at Barbers Point were also a key site of U.S. military development in Hawaiʻi. An in-depth account of the military history at Barbers Point can be found in the main report and Appendix B of the Cultural Resource Survey by Tuggle and Tomonari-Tuggle (1997). The interested reader should seek the full account there.

The military presence on the ʻEwa Plain and Puʻuloa area started with the Reciprocity Treaty in 1887 which granted the U.S. exclusive rights to the waters of Puʻuloa, known today as Pearl Harbor. Strategically, having use of the lochs of Puʻuloa was a great advantage to the U.S. military operations because of Hawaiʻi's central location within the Pacific.

In July 1931, a battery of two 16-inch guns named Battery Hatch was established at Puʻu o Kapolei:

> Battery Hatch was comprised of two gun emplacements with 360 degree fields of fire. There was also a railroad connecting the dispersed emplacements, barracks, and pillboxes for machine guns to provide local defense. (Denfeld 1995:175)

Battery Hatch was named after Brigadier General Henry J. Hatch, who served in Hawaiʻi as a captain in the U.S. Army. The battery stood at the Fort Barrette Military Reservation (Denfeld 1995:175).

The Ewa Mooring Mast Field, which later became known as the Marine Corps Air Station Ewa (MCAS Ewa), was established east of the project area by the U.S. Navy with the intent to develop a base for airships, also known as dirigibles. In 1940, the U.S. military increased their leased area around the Ewa Mooring Mast Field to 3,500 acres and reinstated the mooring mast area to active military use as a Marine Corps Airfield (Tuggle and Tomonari-Tuggle 1997). At the time of the December 7, 1941 Japanese attack, the Marine Corps had expanded the Ewa Mooring Mast Field into an active airfield with two intersecting runways as well as an aircraft warmup platform and mooring apron, and the original mooring mast was converted to a control tower (Truluck and Ruzicka 2014:6). Squadrons were housed in a temporary camp on the north side of the airfield that consisted of "a mixture of quickly built wooden buildings and tents with wooden floors organized on a grid system" (Frye and Resnick 2013:7). Some of the larger caves and pits formed in the underlying coral bedrock were used as ammunition storage bunkers and the smaller ones served as machine gun nests (J. Bond, personal communication, November 8, 2021). The surprise attack on Ewa Field on December 7, 1941 by Imperial Japanese Navy aircrafts resulted in the death of four individuals, wounding of 13 others, and the destruction or partial destruction of all 49 planes parked on the apron. It motivated an expansion of the Marine base as Marine Corps Air Station (MCAS) Ewa from 1942–1943.

In 1942, the Navy moved their Carrier Air Service Units to the newly completed airfield at Naval Air Station (NAS) Barbers Point immediately to the southwest (Frye and Resnick 2013:11). NAS Barbers Point served as "a primary facility for carrier aircraft repair" while neighboring MCAS Ewa was a staging area for aircraft heading to the Pacific front (Tuggle and Tomonari-Tuggle 1997:40). Naval and Marine pilots and support staff who trained at MCAS Ewa were involved in most of the major battles in the Pacific, including Wake Island, Mariana Islands, Solomon Islands and Guadalcanal, Okinawa Island, Emirau Island, Gilbert Islands, Iwo Jima, and the Battles of Coral Sea

and Midway (Resnick et al. 2018:7-2). During the Cold War era, NAS Barbers Point was an integral mid-Pacific military facility with multiple functions, such as antisubmarine patrol, and guided missile units. It served as the Pacific Airborne Barrier Command, among other top-secret surveillance programs (Tuggle and Tomonari-Tuggle 1997:41).

MCAS Ewa was decommissioned in 1952, its airfield was closed, and the surrounding land was absorbed into NAS Barbers Point (Mason 2020:104). Although the MCAS Ewa airfield and support buildings were abandoned at this time, most of the administration and technical buildings next to the airfield continued to be used by the Navy (Figure 66) (Tuggle and Tomonari-Tuggle 1997:41). NAS Barbers Point was closed in 1999 and, except for a few leased parcels, much of the former base property is vacant and is presently overgrown with vegetation.

3.2.12 Recent Development in Honouliuli

Between the end of WWII and the residential boom of the early 1960s, the land in many parts of Honouliuli remained primarily agricultural, and the area around Barbers Point became increasingly developed for industrial and commercial use, eventually becoming known as Campbell Industrial Park. While the 1953 USGS map (see Figure 68) depicts the project area within a still undeveloped area with the US Naval Air Station the northeast, a series of mid- to late-twentieth century aerial photographs and USGS maps show intensifying industrial development and related infrastructure around Barbers Point (Figure 69 through Figure 74).



Figure 66. A 1968 USGS aerial photo showing incipient industrial development north of Barbers Point and the Oʻahu portion of the HIFL project area.



Figure 67. 1977 USGS aerial photograph showing the increasing industrial infrastructure north of Barbers Point and the Oʻahu portion of the HIFL project area.

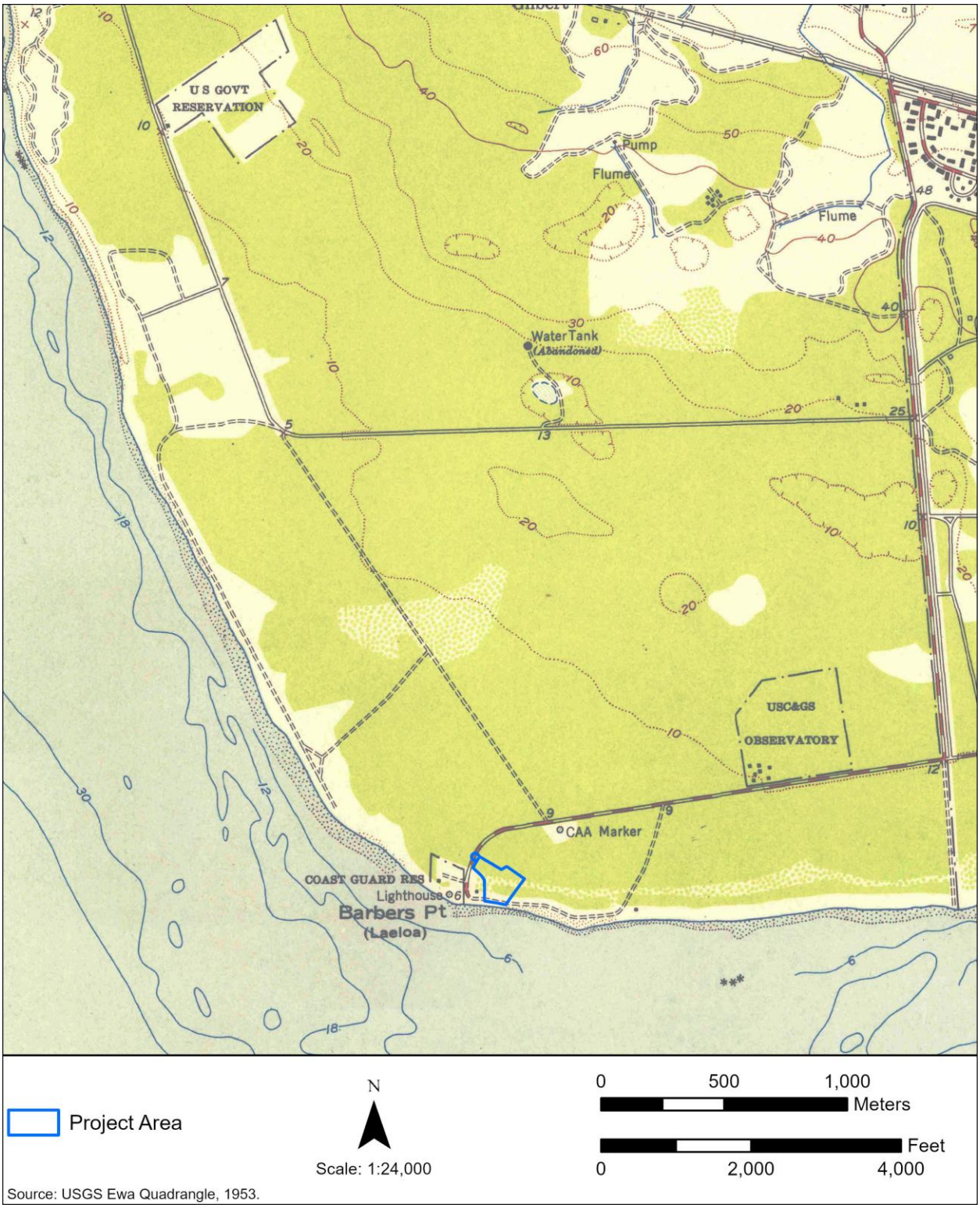


Figure 68. A 1953 USGS map showing road alignments, the United States Coast and Geodetic Survey Observatory with a number of military features to the east of the Oʻahu portion of the HIFL project area.



Figure 69. A 1962 USGS map shows the continued development of Barbers Point and the persistence of military features.

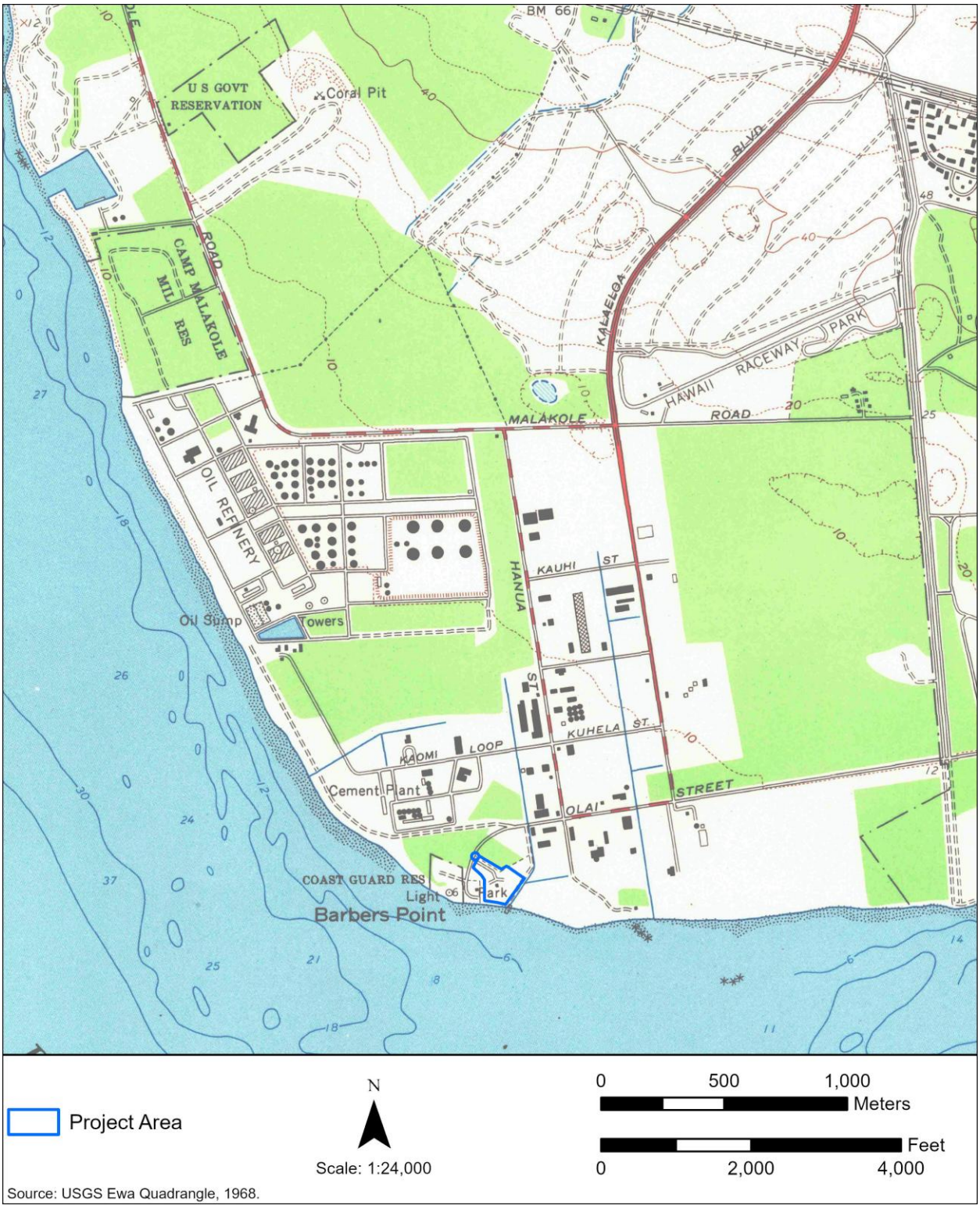


Figure 70. A 1968 USGS map shows further development of Barbers Point including a raceway park *mauka* of the Oʻahu portion of the HIFL project area.



Figure 71. A 1983 USGS map shows further development of the industrial area north of Barbers Point and the Oʻahu portion of the HIFL project area.



Figure 72. A 1998 USGS map shows continued industrial development and the Coast Guard Reservation to the west of the Oʻahu portion of the HIFL project area.



Figure 73. A 1993 NOAA aerial photo. Note the encroaching urban and industrial developments within former agricultural lands.

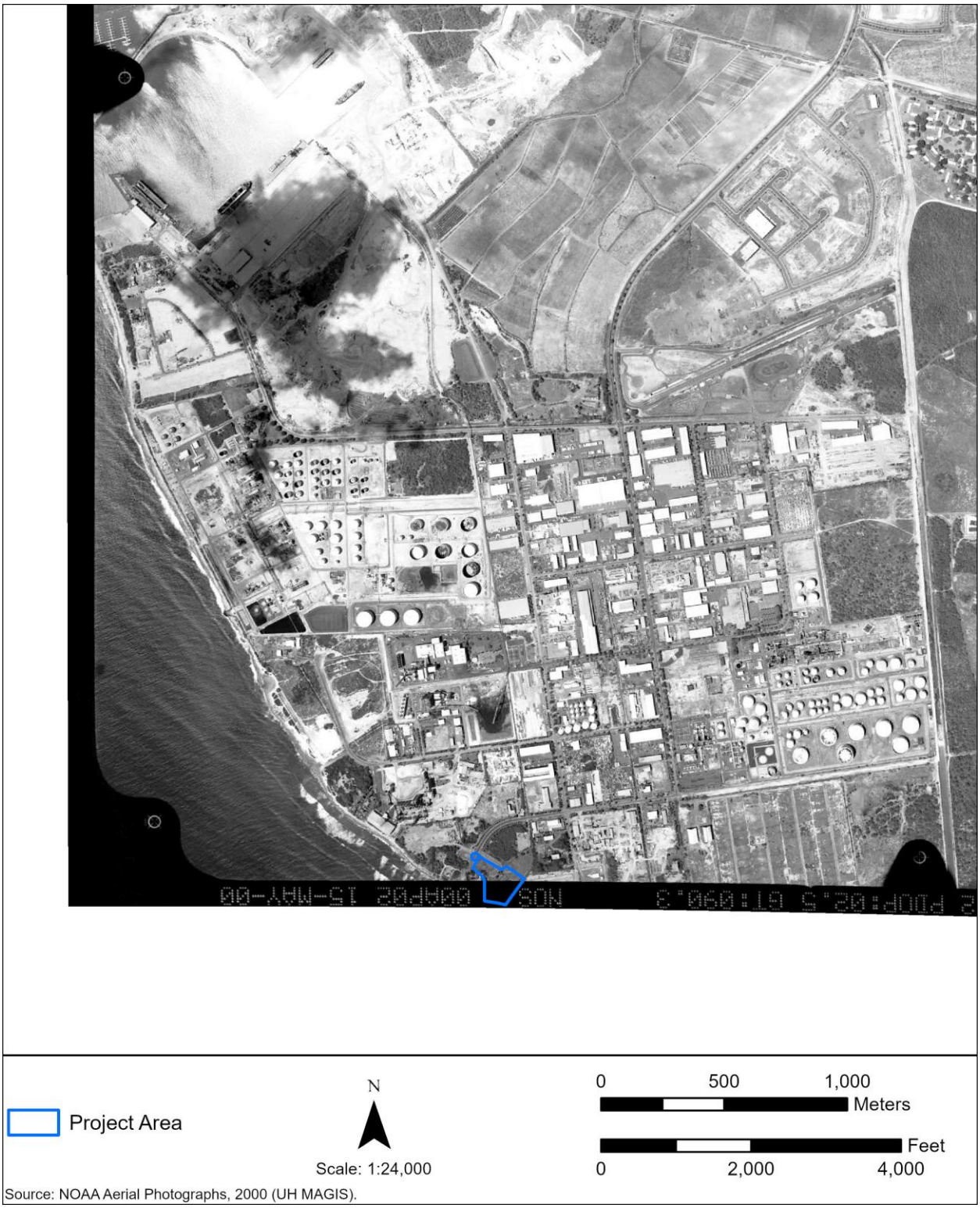


Figure 74. 2000 NOAA aerial photo showing dense industrial development north of Barbers Point and the Oʻahu portion of the HIFL project area.

3.2.13 Previous Consultation for Nearby Projects in Honouliuli Ahupuaʻa

The knowledge shared in previous CIAs for Honouliuli Ahupuaʻa, specifically around Barbers Point, can provide further understanding of the cultural practices and the exercising of Native Hawaiian rights in this area. McElroy et al. (2015) and Mulrooney and Pacubas (2021) emphasized traditional and enduring subsistence, habitation, and recreational activities in the area. One participant stated that Kalaeloa and Waiʻanae did not follow the typical *ahupuaʻa* system because during the dry season, families moved towards the mountains or down to the coast (McElroy et al. 2015). Traditional trails connected *ahupuaʻa* with the surrounding area. Traditionally, the land was dry with freshwater underground that could be accessed through limestone *kālua* (pit caves) and other sources. Participants' ancestors taught them their locations (McElroy et al. 2015, Mulrooney and Pacubas 2021). *Kālua* were used for burials, cultivation of *kī* (ti), dryland *kalo* (taro), *ʻuala* (sweet potato), *niu* (coconut), and *maiʻa* (banana). Larger *kālua* were occasionally used for habitation (McElroy et al. 2015; Mulrooney and Pacubas 2021). Participants described finding bones of *ʻiʻiwi* (*Drepanis coccinea*), *kioea* (*Chaetoptila*), extinct *moa-nalo* geese (*Thambetochen*), *ʻalalā* (*Corvus hawaiiensis*), and *pueo* (owl; *Asio flammeus sandwichensis*) within the *kālua* (McElroy et al. 2015).

The landscape has profound cultural importance; however, participants stated that some details were inappropriate to share. The area was traditionally known for unique cloud patterns and the winds that come from the mountains. The sun, rains, and seasonality were important to *kupukaʻaina* families and places like Puʻuokapolei and adjacent *heiau* are important to this religious practice. Participants discussed being taught to observe the seasons and associated celestial movements there. Seasonal observations still occur today (Bond 2015; McElroy et al. 2015; Mulrooney and Pacubas 2021). The landscape was also a place for transcending between the physical and ethereal plains. One participant offered an alternative translation of Honouliuli, meaning to go deep into the realm of *pō*, into the *uliuli*, into the dream, subconscious state. Kumu Kahu Michael Lee, and other sources, recount a *Leina a ka uhane*, or a place of leaping spirits, across Honouliuli with many burials in the region (Bond 2015; Maly and Maly 2012; Tanaka et al. 2024). In Honouliuli, some inadvertently discovered burials had associated adornments such as a *niho palaoa* (whale-tooth pendants), indicating they were *aliʻi* (Tanaka et al. 2024:81).

It was a spiritual, religious practice to raise *manō* (sharks) in Kalaeloa. The *moʻolelo* of Kaʻahupahou, the shark god, and her grandmother are famous in ʻEwa. Puʻuloa is the dwelling place of Kaʻahupahou and her brother Kahiʻukā, as shared in the *mele* Pupu a o ʻEwa (Mulrooney and Pacubas 2021). Sharks and turtles were considered *ʻaumakua* (McElroy et al. 2015; Mulrooney and Pacubas 2021). Various *moʻolelo* of Hiʻiaka identify significant places, such as Kaupeʻa, and the prevalence of *mahamoe* and *ʻōkupe*. Two specific plants were first introduced in Honouliuli; a specific variety of *kalo* was brought from Tahiti for Pele and the first ʻ*ulu* (breadfruit). Participants described that descendants of both varieties are now transplanted to Waiʻanae for safe keeping (McElroy et al. 2015).

Participants described traditional and modern fishing around the area including pole fishing, shore fishing, *hukilau* (fishing with a seine), and *paipai*, as well as diving. Fishing and swimming in the area occurred nearly every day in their childhood. *Limu wāwaeʻiole, ogo, kohu, manuea* and other seaweed were gathered. Mr. Lee's video discussions of Honouliuli were referenced in Tanaka et al.'s (2024:80) Ka Paʻakai Analysis in which he calls the shoreline at Honouliuli "Hale o Limu" (House of Limu). Formerly, up to 80 varieties of *limu* were found in the ocean around Honouliuli and they would accumulate on the shore in piles up to two feet high (Tanaka et al. 2024:80). The karst system beneath Honouliuli provides natural drainage of the area and carries freshwater into

the ocean through springs along the shoreline, which in turn contribute to the health of the *limu* (Tanaka et al. 2024:80). Mr. Lee further stated that Niʻihau shells are a good indicator of a healthy *limu* population. When there are large quantities of Niʻihau shells along the shore, the *limu* is healthy (Tanaka et al. 2024:80). Participants knew the reefs and specific fish-houses well and where to gather specific fish, such as menpachi, *kala* (*Naso unicornis*)*, manini* (*Acanthurus triostegus*)*, akule* (*Selar crumenophthalmus*), *awa* (*Elops hawaiensis*), *aholehole* (*Kuhlia marginata*), *hāʻukeʻuke* (*Colobocentrotus atratus*), *pāpaʻi* (crabs), *heʻe* (octopus), *ulua* (*Caranx ignobilis*), turtles, dolphins, flying fish, and stingray. Sharks were also plentiful in the area.

Participants lamented about the environmental and cultural degradation in the area. Previously, they saw many *pueo* (owls) and multi-colored dragonflies, but no longer (McElroy et al. 2015; Mulrooney and Pacubas 2021). Additionally, participants noted that the freshwater resources are no longer potable. One participant mentioned that some *kālua* caved in, preventing access, when bombing began (McElroy et al. 2015). Participants also noted that the development of the Kalaeloa Barbers Point Harbor has significantly impacted the area's marine resources. For example, they no longer see *ʻanae* (*Mugil cephalus*) spawning in natural inlets that previously existed nor do they see as much mullet (McElroy et al. 2015). The reefs died with development and the fish left. The only reef left is right in front of Lanikuhonua. Participants noted seeing and using a variety of traditional plants and medicinal plants: *ʻaʻaliʻi* (*Dodonaea viscosa*), *ʻakoko* (*Euphorbia skottsbergii*), fine *kaunaoa* (*Cuscuta sandwichiana*), *noni* (*Morinda citrifolia*), and *ʻilima papa* (*Sida fallax*). Mr. Lee further noted that when pollutants enter the karst system, they eventually seep into the ocean and sand through the springs along the shore, negatively impacting the plants, animals, and humans that that depend on these resources (Tanaka et al. 2024:80).

Participants advocated for preserving *kālua*, protecting burials, and ensuring no further environmental degradation occurs, stressing that people continue to rely on the area for subsistance. They requested on-site cultural and archaeological monitors for any development. In short, participants advocated for the long-term care of the area as a cultural resource.

3.2.14 Previous Archaeology

A total of 16 archaeological studies have been conducted within a 0.5-mile (0.8-km) buffer around the Oʻahu portion of the HIFL project area at Barbers Point Beach Park. Table 8 provides an overview of all 16 archaeological investigations with a summary of their findings and they are shown in Figure 75. A total of 10 historic properties have been identified within the 0.5-mile buffer. All 10 previously identified historic properties are described in Table 9, which also contains significance assessments and mitigation recommendations. These historic properties are shown in Figure 76.

Although no historic properties had been previously identified within the current project area, nearby sites reflect a mix of pre- and post-Contact activities in the Barbers Point area. The surrounding area is relatively flat, dotted with numerous limestone *kālua*. Previous archaeological investigations (Davis 1988, Davis 1989, Davis 1990, Medina and Hammatt 2015, Belluomini et al. 2017, Spangler et al. 2020) have revealed extensive complexes of pit caves that included pre-Contact Native Hawaiian cultural resources and burials.

Previously identified post-Contact historic properties include features associated with the commercial sugarcane industry, maritime history, and coastal navigation and defense. These

included irrigation ditches, military complexes related to the Barbers Point Military Reservation, the Barbers Point Lighthouse, and two documented shipwrecks, the *Arthur* (1796) and *Liliu* (1877).

During Pacific Legacy's field inspection, carried out as part of the LRFI for the HIFL Project, no potential historic properties were identified within the Oʻahu portion of the HIFL project area.

Table 8. Previous Archaeological Studies within 0.5 Miles of the Oʻahu Portion of the HIFL Project Area

Reference	Type of Study	Findings
Clark 1979	Archaeological Reconnaissance	No historic properties identified.
Ahlo and Hommon 1983	Archaeological Reconnaissance	Identified eight potential historic properties consisting of pits and possible deposits. No historic properties identified within 0.5 miles of the current project area.
Hommon and Ahlo 1984	Test Excavations	Conducted testing at six historic properties previously identified by Ahlo and Hommon (1983). All are located more than 0.5 miles from the current project area.
Davis 1988	Archaeological Reconnaissance	Identified at least 15 limestone pits with data recovery potential including one within 0.5 miles of the project area: SIHP 50-80-12-04099. No significance assessments were made.
Davis 1989	Archaeological Investigation	Determined that four limestone pits previously identified by Davis (1988) had been destroyed by bulldozing activities.
Carlson and Rosendahl 1990	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Davis 1990	Archaeological Inventory Survey	Excavated four of 13 limestone pits previously documented by Davis (1988). Identified a human burial at SIHP 50-80-12-04099 within 0.5 miles of the project area. No assessment of significance or recommendations were made at that time.
Schilz and Landrum 1996	Test Excavation	No historic properties identified.
McCoy and Clark 2008	Archaeological and Cultural Impact Assessment	No historic properties identified.
Groza and Hammatt 2010	Archaeological Monitoring	No historic properties identified.
Condit and Allen 2011	Archaeological Monitoring	No historic properties identified.
Runyon et al. 2012	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Medina and Hammatt 2015	Archaeological Monitoring	Identified one historic property, SIHP 50-80-12-07402, a pre-Contact cultural deposit, within 0.5 miles of the project area. SIHP -07402 was assessed as significant under Criterion d and archaeological monitoring was recommended for any future ground disturbing activities.
Belluomini et al. 2017	Archaeological Inventory Survey	Two historic properties identified: SIHP 50-80-12-06866 (military complex), assessed as significant under Criteria a and d; no further work was recommended for the northern mount and concrete slab, but the central mount was to be preserved; SHIP 50-80-12-07835 (limestone pit complex) assessed as significant under Criteria d and e; 50 of the 68 pit caves were recommended for preservation and six were infilled for future investigation.

Reference	Type of Study	Findings
Fechner and Cleghorn 2017	Archaeological Monitoring	No historic properties identified.
Spangler et al. 2020	Archaeological Monitoring	Two historic properties identified within 0.5 miles of the current project area (SIHP 50-80-12-06866 and 50-80-12-07835). One feature (WWII-era gun emplacement) was added to SIHP -06866 and subsequently demolished. SIHP -06866 was assessed as significant under Criteria a and d, while SHIP -07835 was assessed as significant under Criteria d and e. The study recommended preservation for the extant features of SIHP -07835 and that SHPD be consulted for any future ground disturbing activities that may impact either site.

Note: Previous studies that include the current project area are highlighted in gray.

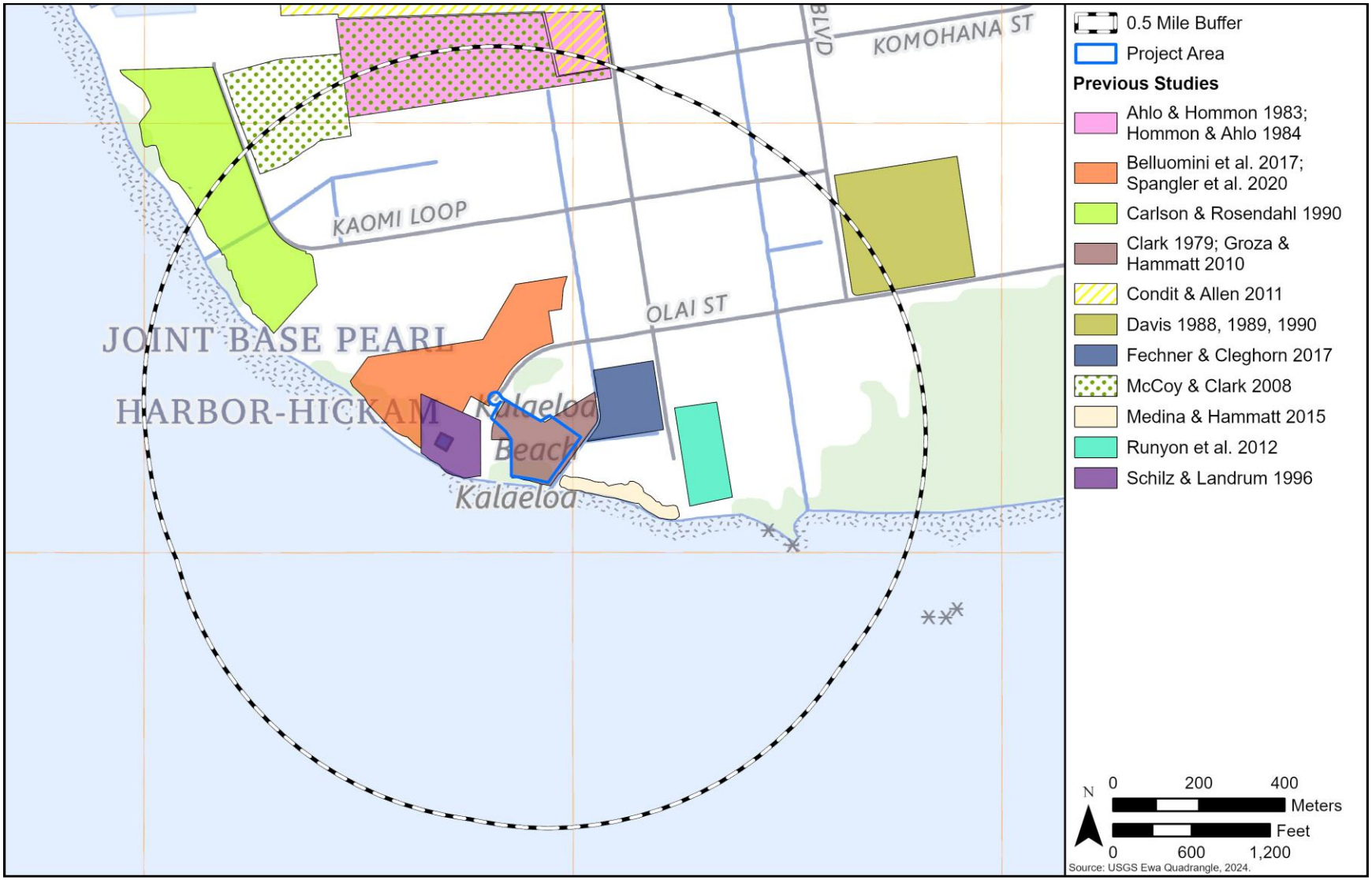


Figure 75. Previous archaeological investigations within a 0.5-mile radius of the Oʻahu portion of the HIFL project area.

Table 9. Previously Identified Historic Properties within 0.5 Miles of the Oʻahu Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
50-80-12-04099	Limestone pit complex, burial	Paleoenvironmental data, burial	Pre-Contact	d	No Further Work	Davis 1988, 1989, 1990
50-80-12-06866	Complex (gun emplacement and concrete slab)	Coastal defense	Post-Contact	a, d	Preservation	Belluomini et al. 2017; Spangler et al. 2020
50-80-12-06950	Irrigation ditch	Agriculture - intense mechanized	Post-Contact	d	None provided	On File, SHPD
50-80-12-06951	Irrigation ditch	Agriculture - intense mechanized	Post-Contact	d	None provided	On File, SHPD
50-80-12-07402	Cultural deposit	Temporary habitation	Pre-Contact	d	Archaeological Monitoring	Medina and Hammatt 2015
50-80-12-07835	Pit cave complex	Potential activity area	Unknown	d, e	Preservation, Archaeological Monitoring	Belluomini et al. 2017; Spangler et al. 2020
50-80-12-08938	Burial	Burial	Pre-Contact	-	None provided	On File, SHPD
No SIHP	Barbers Point Lighthouse	Communication	Post-Contact	-	None provided	National Register of Historic Places 2024
SCR No. 850	“Arthur”	British brig (Captain Barber) reported lost 1796 near Barber’s Point	Post-Contact	-	None provided	BOEM 2017
SCR No. 404	“Liliu”	Schooner lost in 1877	Post-Contact	-	None provided	BOEM 2017

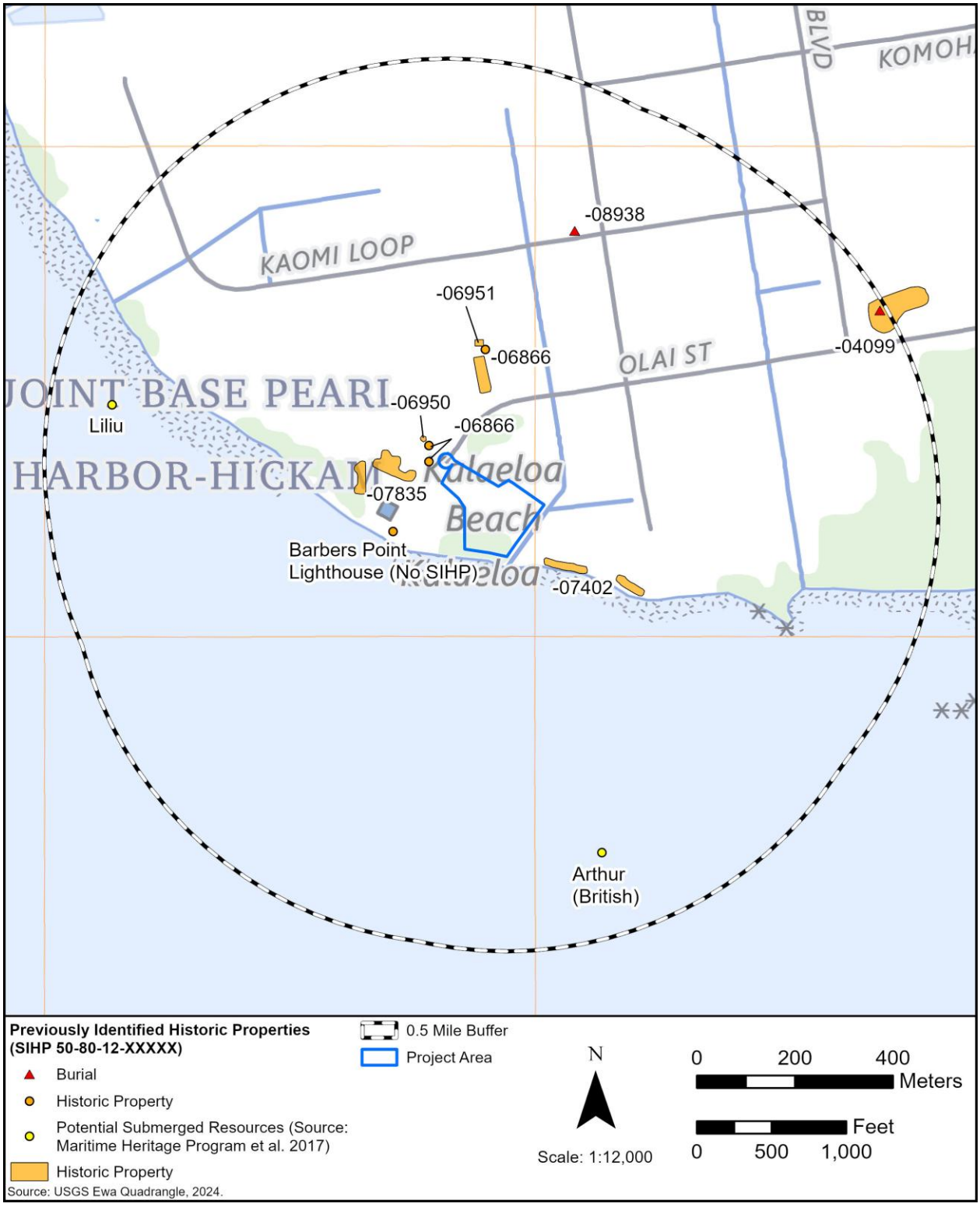


Figure 76. Previously identified historic properties within 0.5 miles of the Oʻahu portion of the HIFL project area.

3.2.15 Summary of Archival and Background Research for the Oʻahu Cable Landing Site

The Oʻahu portion of the HIFL project area is located in a coastal portion of Honouliuli, at Barbers Point Beach Park. The area around Barbers Point Beach Park, traditionally known as Kalaeloa, lies within the uplifted coral reef of the ʻEwa Plain, characterized by abundant limestone pit features. These limestone pits are known to have been used for agricultural activities, and have also been found to house paleontological remains, cultural midden deposits, as well as burials in some instances. Paleoenvironmental data recovered from limestone pits and sediment cores recovered from Ordy Pond (located in Kalaeloa approximately 3.5 miles east of the project area) have provided important data for understanding past landscapes and environmental transformations shortly after people first arrived on Oʻahu. This includes avifaunal and terrestrial mollusk remains, including some now-extinct or extirpated species, and transitions from native forest cover to open canopy. While *kalo* was grown in abundance in the lowlands of Puʻuloa (known today as Pearl Harbor, the West Loch of which is approximately 6.8 miles northeast of the project area), the drier interior of Honouliuli was referred to as sweet potato land, with mid-nineteenth-century descriptions of planting in hollows of rocks and near the brackish water ponds scattered throughout this landscape.

During the Mahele, Honouliuli Ahupuaʻa was awarded to Miriam Keʻahikuni Kekauʻōnohi. Most of the LCAs awarded were located near Honouliuli Stream in the Puʻuloa/West Loch area. Archival research did not identify any LCAs in the vicinity of the Oʻahu portion of the HIFL project area.

The post-Contact name Barbers Point, as well as the lighthouse that was eventually built there, both trace their origins to Captain Henry Barber's ship, the *Arthur*, which ran aground at Kalaeloa in 1796. After ships continued to run aground in this area, a lighthouse was built in the 1880s. Other post-Contact land use in the area was largely focused on commercial ranching and agriculture. Honouliuli Ranch, established by James Campbell in 1881, occupied approximately 41,000 acres. Some of these lands were subsequently devoted to other ventures including rice, sugarcane, and sisal agriculture, bee-keeping, fishing, and limestone quarrying. By the early 1900s, *kiawe* forests stretched along a large portion of Oʻahu's southwestern coast. In 1890, the Ewa Plantation Company was established and became one of the largest and most prosperous sugarcane operations in Hawaiʻi. On November 16, 1889, the OR&L Railroad began operations, and subsequently experienced a surge in popularity during WWII. Land use in Honouliuli shifted considerably during the war, as Puʻuloa and the adjacent ʻEwa Plain became a key site of military development. The residential boom of the 1960s included plans for the "Giant New Oahu City" of Makakilo. Over time, residential and commercial development in the areas of Makakilo, Kapolei, and Campbell Industrial Park have gradually replaced the previous ranching, sugar cultivation, and military activities that were once widely practices in Honouliuli. In 1976, West Oʻahu College opened in Kapolei, eventually becoming the University of Hawaiʻi – West Oʻahu in 1989.

Previous archaeological studies in the immediate vicinity of the project area identified historic properties with both pre- and post-Contact associations. Nearby historic properties associated with pre-Contact activities include a cultural deposit and complexes of modified and unmodified limestone pits, which are ubiquitous across the ʻEwa Plain. The post-Contact historic properties in the vicinity are associated with agricultural and military activities. The *Arthur* and the *Liliu* are located offshore in the vicinity of the project area. No historic properties have previously been identified within the Oʻahu portion of the HIFL project area at Barbers Point Beach Park.

3.3 MAUI CABLE LANDING SITE

The Maui portions of the HIFL project area are within the *moku* (district) of Wailuku, and the *ahupuaʻa* (traditional land division) of the same name. Wailuku Ahupuaʻa follows the traditional *mauka* to *makai* (from the mountains to the sea) pattern, extending from the foothills of the West Maui Mountains, across the lowlands at the base of the *kula* (open country, pature) lands, and along a portion of the northern shore. Wailuku is one of the "Four Waters of Maui," or *Na Wai Ehā*, along with Waikapu, Waiehu, and Waiheʻe. These four *ahupuaʻa* were later grouped into a single district known as Na Poko (Thrum 1890).

Pukui et al. (1974) defined Wailuku as "water [of] destruction," and attributed the name to Wailuku being the site of a significant late eighteenth-century battle between Kalaniʻōpuʻu and Kahekili, *mōʻī* (sovereign) of Hawaiʻi and Maui islands, respectively. An alternate explanation attributes the name to the 1790 Battle of ʻĪao, also known as the "Battle of Kepaniwai," or "the damming of the waters." Pia Cockett (in Sterling 1998) attributed this name to the time of Kamehameha I and his battle with the warriors of Maui, though Sterling noted that she and Pukui both believed the name Wailuku was older (Sterling 1998:74). In the *moʻolelo*, the "Battle of the Owls," the owls of every island united to seek revenge against a man who destroyed the eggs of a mother owl, the name Wailuku ("water-of-killing") is attributed to the day that the owls filled the skies of Wailuku and successfully battled the man in punishment for his deed (Pukui 1994).

The Maui portions of the HIFL project area are located at Kahului Harbor and UH Maui College. Pukui et al. (1974) suggested that Kahului probably translates literally to "the winning," and noted that the area is home to a notable surfing area known as the Kahului Breakwater (Pukui et al. 1974).

3.3.1 Significant Place Names

A selection of place names associated with Wailuku Ahupuaʻa that are referenced in this document are listed in Table 10 and depicted in Figure 77. Place names have been identified through Boundary Commission Testimonies, historic maps, and information received from CIA participants. Literal translations of place names have been added when they could be found in Pukui et al. (1974) or Pukui and Elbert (1986).

Tanaka and Hammatt (2020) observed that there were few coastal place names around Kahului, and that this may be related to a highly dispersed pre-Contact population, with denser concentrations of people around Wailuku and further east.

Table 10. Place Names Associated with Wailuku Ahupuaʻa

Place Name	Description	Map Source
Halekiʻi	Heiau; Walker Site 44; "A large *heiau* [place of worship] of the same type as Pihana, constructed with water-worn boulders" (Sterling 1998:78); *lit.* "image house" (Pukui et al. 1974:37) because it was adorned with rows of images that represented various deities (Sterling 1998:77) and "alternate name for the *heiau* at Pihana, Maui" (Pukui et al. 1974:37). It is not known when or by whom the *heiau* was built, though it may have been at the order of Kahekili (Sterling 1998:77). Some consider Halekiʻi to be within "Pihanaakalani" with Liliha and Kalola, all *heiau* of *luakini* (sacrificial) type (Sterling 1998:75)."…Halekii is the heiau reserved for females of high rank and is situated on the makai side of the bluff—Kalola is another name. The whole combined in general is Pihana" (Sterling 1998:75-76).	USGS 1955
ʻĪao	Stream, valley, and peak. Once the sacred burying place of chiefs; *lit.* "cloud supreme" (Pukui et al 1974:55); stream is sometimes referred to as "Wailuku River" in LCA descriptions.	USGS 1955
Kahului	Town, bay, beach, and surfing area known as Kahului Breakwater; *lit.* "the winning" (Pukui et al. 1974:67). According to Ashdown (1976), the beach at Kahului was named Makawela, or "burning eyes," a reference to the *kapu* (sacred taboo) of the burning sun which was specific to *aliʻi* on Maui.	USGS 1955
Kaluli	*Heiau;* Walker Site 42; at Puʻuohala, repaired and consecrated by Kahekili in preparation for war with Kalaniʻōpuʻu, who had been defeated at Kaupo. Kahekili was strengthening his forces in anticipation of a further attack from Kalaniʻōpuʻu. Lacking a high priest, Kahekili sent to Oʻahu for Kalaeopuʻupuʻu, who had been the high priest of the late Peleʻioholani. Kalaeopuʻupuʻu instructed Kahekili to repair and consecrate Kaluli, after which he performed his rites and assured, "*Ua komo o ka ia i ka makaha ua puni i ka nae"* - the Hawaiʻi forces would be caught like fish in a net (Fornander 1880:152; Sterling 1998:75). The *heiau* was located above Puohala Camp in the cane fields, but is now totally destroyed (Sterling 1998:75).	Thrum 1908, Sterling 1998:75
Kamaʻomaʻo	Plain; *lit.* "the greenness" (Pukui et al. 1974:81); "the name given to the sandy plain between Kahului and Wailuku, Maui" (Emerson 1915:76). According to Beckwith (1940) Kamaʻomaʻo was a barren, desolate plain where malicious spirits (*kuewa*) wandered, feeding on spiders and night moths and delighting in leading travelers astray. Also a home to owl deities like Pueonuiokona, who restored life to wandering souls (Fornander 1919).	Soehren 2019
Kanahā	Fishpond and wildlife sanctuary; sometimes referred to as the "twin ponds of Kapiʻioho" with Mauʻoni, as the construction of the banks is often attributed to Kapiʻiohookalani (Sterling 1998:87); others attribute the building to Kiha-a-Piʻilani in the 1500s (Kamakau 1961, Pukui et al. 1974). Home to Hawaiian stilts (*āeʻo*; *Himantopus mexicanus knudseni*), as well as herons, geese, ducks, owls, plovers, sandpipers, tattlers, coots, pheasants and doves (Pukui et al. 1974:83).	USGS 1955
Kaulupala	*Heiau*; Walker Site 52, located in the vicinity of Wailuku, is no longer extant; said to be among those consecrated by Liholiho in his tour of Maui for that purpose in ca. 1801 (Sterling 1998:79).	Soehren 2019
Kepaniwai	Park; *lit.* "the water dam" as "Wailuku Stream was choked with human bodies after the slaughter there" (Pukui et al. 1974:109).	USGS 1955

Place Name	Description	Map Source
Kūkaemoku	Rock formation; traditional name for ʻĪao Needle; *lit.* "broken excreta" (Pukui et al. 1974:120); also known as Puʻuokamoa (Sterling 1998:79); other pronunciations include "Kekaʻe Moku…it was used as a lookout by warriors in ancient times. Probably means 'standing on the boundary,'" (Pukui, as recorded by Sterling 1998:79)."On one side there is something like a ridge where there is a stone. It was there an alii hid, the chief who lived above at the place, Kaʻalāholo. Kaʻalā-holo is table land on the left hand side of Iao Valley. Kinihapai is behind the needle. The chief Kakaʻe was born and reared in Kaʻalāholo. The work of Kakaʻe was to care for the spring for the fish which the runners brought to the upland chiefs. Kakaʻe took care of a large stone in which there was a depression. Sea water and the fish were put into this so that whenever the chief desired he had live fresh fish to eat. The fish was still flipping when put into the chief's mouth" (Sterling 1998:79).	USGS 1955
Lelemākō	*Heiau*; Walker Site 50. *Lit.* "rough leaping," though in reference to a place in north Molokai (Pukui et al. 1974:131); located in vicinity of Wailuku, no longer extant; said to have been consecrated by Liholiho in tour of Maui in ca. 1801 (Sterling 1998:79).	Soehren 2019
Mauʻoni	Fishpond; sometimes referred to as the "twin ponds of Kapiʻioho" with Kanahā, as the construction of the banks is often attributed to Kapiʻiohookalani; though other *moʻolelo* attribute the building to Kiha-a-Piʻilani, "Keawe-nui-a-ʻUmi sailed form Hilo to Kapuʻekahi in Hana and from Hana to Kahului of Wailuku. There the chief of Hawaii met Kiha-a-Piʻilani, ruler of Maui. Kiha-a-Piʻilani was building the walls of the pond of Mauʻoni. A wide expanse of water lay between Kaipuʻula and Kanaha, and the sea swept into Mauʻoni. The two ruling chiefs met and greeted each other with affection" (Sterling 1998:88).	Soehren 2019
Paukūkalo	Homesteads, coastal area, surfing spot; *lit.* "taro piece" (Pukui et al. 1974:181); or alternatively "Pauku=chunks; kalo=taro. Called thus because of the taro or possibly because of the rockiness of the land, the rocks lying like big chunks of taro" (Sterling 1998:90). According to *moʻolelo,* stones from this beach were used to build Pihana Heiau*,* built in a single night by *menehune* (legendary race of people)*,* or alternatively, by Chief Kahekili (Pukui et al. 1974:184).	USGS 1955
Pihana	*Heiau*; Walker Site 43 *lit.* "fullness" (Pukui et al. 1974:184); said to have been built by *menehune* in a single night using stones from Paukūkalo (Beckwith 1940:333), though others attribute its construction to Kahekili, rather than *menehune* (Pukui et al. 1974:184). Pihana may be the site of several heiau:"Pihanaakalani, wherein is the heiau of Halekii, Liliha and Kalola," all *luakini heiau* (Sterling 1998:75). *Moʻolelo* relates: "Kiikewa, the high chief who lived 'at the time of Kakae; the king of West Maui, built the Heiau of Pihana—every rebellious high chieftains of Maui were sacrificed at this heiau, but, no alii whose lineage was tainted were sacrificed on its alter; Liliha is the name of Luapaʻu (offal pit). Halekii is the heiau reserved for females of high rank and is situated on the makai side of the bluff—Kalola is another name. The whole combined in general is Pihana. It is said there is a cave beneath Pihana, and Liliha is the name of the cave" (Sterling 1998:75-76).	USGS 1955
Puʻunēnē	Town, land section; *lit.* "goose hill" (Pukui et al. 1974:202); the site of a battle between Ka-uhi and his brother, Kamehameha-nui. Ka-uhi called in Pele-io-holani from Oʻahu to aid him in the battle, "The hardest fighting…took place on the day of the attack at Puʻunene. Pele-io-holani was surrounded on all sides, *mauka* and *makai,* by the forces of Alapaʻi, led by Ka-lani-ʻopuʻu and Keoua. The two ruling chiefs met there again, face to face, to end the war and become friends again, so great had been the slaughter on both sides" (Sterling 1998:91).	USGS 1954
Waiʻale	Two reservoirs; *lit.* "rippling water" (Pukui et al. 1974:220); used by HC&S for sugarcane irrigation (Wilcox 1996).	USGS 1955
Wailuku	Point; stream; *lit.* "water [of] destruction" (Pukui et al. 1974:225); site of the battle in the late 18th century in which the army of Kalaniʻōpuʻu was nearly annihilated by Kahekili of Maui (Pukui et al. 1974:225).	USGS 1955

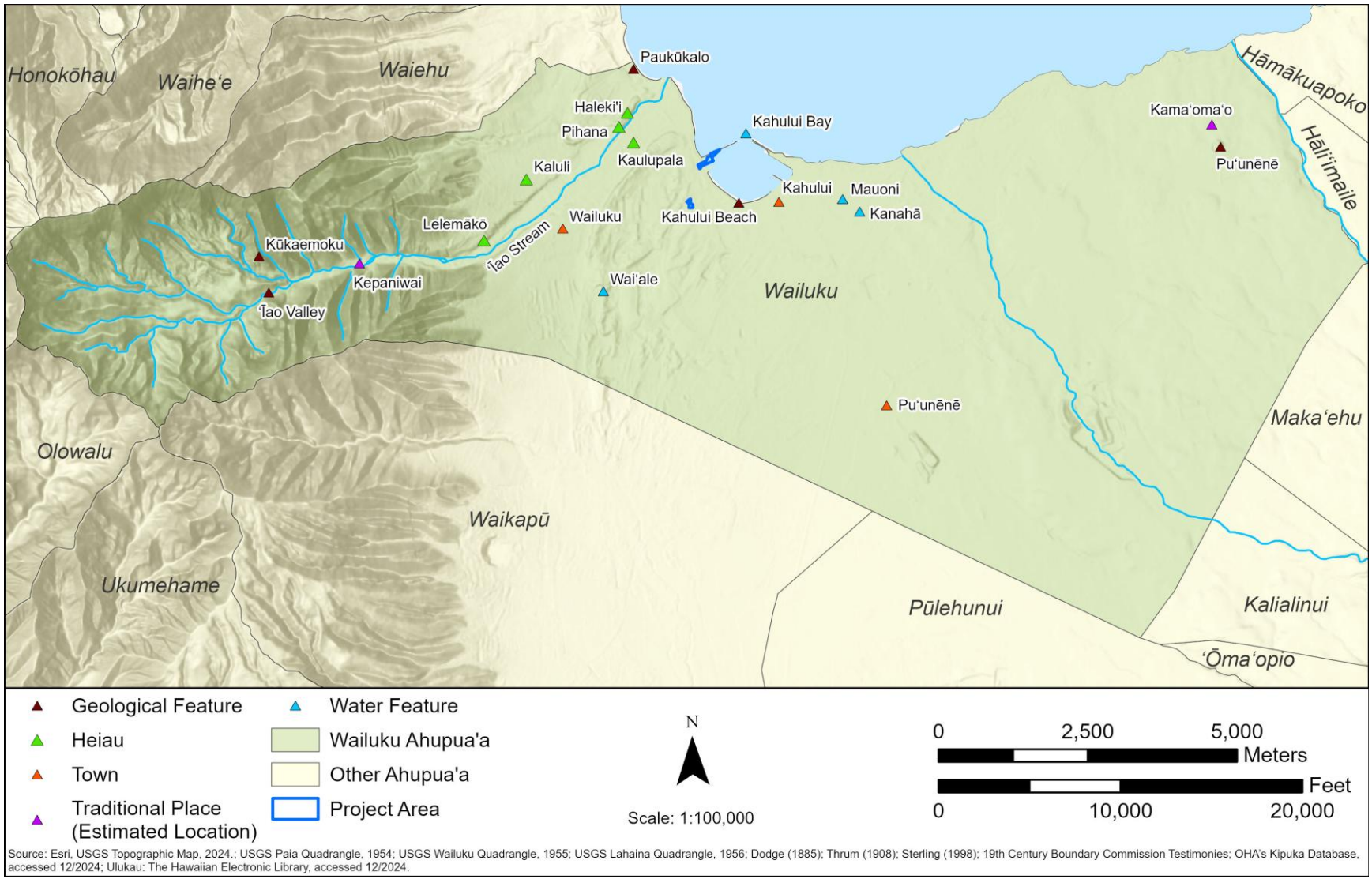


Figure 77. Traditional place names in Wailuku Ahupuaʻa.

3.3.2 Moʻolelo

There are a large number of *moʻolelo* that relate to Wailuku. A selection that may especially pertain to the surroundings of the project area are presented here, which include associations with the broader Na Wai Ehā region, Kanahā and Mauoni ponds, the plains of Kamaʻomaʻo, and the Pihana Heiau complex.

Winds of Na Wai Ehā

In the Legend of Kūapākaʻa, the winds of Maui are among those called by Kūapākaʻa when the *mōʻī* of Hawaiʻi Island, Keawenuiaʻumi, sailed to find Pākaʻa and bring him back into his service. Pākaʻa was the son of Laʻamaomao, who could control the winds, and he kept the bones of his mother in a calabash that was called "the wind calabash of Laʻamaomao" (Fornander 1918:72). Pākaʻa had been highly favored by Keawenuiaʻumi, and was raised to the highest office in his household and given command of the *mōʻī*'s canoe. However, Keawenuiaʻumi became displeased with Pākaʻa and granted the powers and privileges the former once enjoyed to two new men, Hoʻokeleihiho and Hoʻokeleipuna. Pākaʻa was left only with overseeing the personal effects of the *mōʻī*, and so he departed, placing Keawenuiaʻumi's *kapa* (barkcloth), *malo* (loincloth), and other effects in the calabash Laʻamaomao. Kūapākaʻa was born on Molokai and trained by his father to serve the *mōʻī*, in case Keawenuiaʻumi realized he missed Pākaʻa and searched for him to return.

Eventually Keawenuiaʻumi did come to recognize he missed Pākaʻa. When the *mōʻī* and his retinue came to Molokai to find him, Pākaʻa obscured his face and had his son speak to the king and his chiefs. Kūapākaʻa upset many of Keawenuiaʻumi's chiefs by calling each of them out by name, telling them they were not chiefs by birth, and listing the faults of their districts. Kūapākaʻa then chanted about the sea, predicting a dangerous storm that would prevent Keawenuiaʻumi from landing in Kaula safely. However, Keawenuiaʻumi's men were skeptical about Kūapākaʻa's predictions and called him a deceiving boy, as they saw no clouds, rain, wind, or lightning. When Kūapākaʻa told his father that the chiefs advised Keawenuiaʻumi to press on, Pākaʻa told him to call out for the winds of Hawaiʻi. Keawenuiaʻumi became angry with Kūapākaʻa for calling for the winds, and began to sail off. Pākaʻa then instructed him to call for the winds of Kauaʻi and Niʻihau. Kūapākaʻa's calling of the winds summoned a great storm, swamping the canoes of Keawenuiaʻumi and his men as they tried to leave. Kūapākaʻa then called for the wind of Kaula. As Keawenuiaʻumi i grew angrier Kūapākaʻa called the winds of Maui and Molokai:

> The pakiele is of Waiakea,
> The aimauna is of Hana,
> The ailoli is of Kaupi,
> The papa is of Honuaula,
> The anulu is of Kanaloa,
> The kehau is of Kula,
> The uapokoa is of Kokomo,
> The elehei-rain is of Lilikoi,
> The iaiki is of Wailuku,
> The oopu is of Waihee,
> The akula is of Pohakuloa,
> The waiuli is of Honolua,
> The pohakea is of Mahinahina,
> The maaa is of Lahaina,

The Alani is of Liloa,
The paala is of Makaha,
The laukowai is of Kekula,
The holokaomi is of Paomai,
The wind that doubles up is of the lowlands;
It is the kupa, the okea wind.
The paiolua is of the ocean,
It is the hoolua and the moae.
The kaele is of Palaau,
The iaiki is of Hoolehua,
The kuapa is of Moomomi,
The kaele is of Kalelewaa,
The puupapai is of Kaamola,
The paikaika is of Wailua,
The hoolua is of Halawa.
(Fornander 1918:100)

Keawenuiaʻumi and his men still believed they were being deceived, even after Pākaʻa recited the names of all of the *mōʻī*'s men. As Keawenuiaʻumi and his retinue continued to withdraw, Kūapākaʻa uncovered the wind calabash, Laʻamaomao, which brought forth a mighty storm and finally induced Keawenuiaʻumi and his men to land.

Rebecca Nuuhiwa also described the four winds of *Na Wai Ehā* in Sterling (1998):

Wailuku's wind is the Makani-lawe-malie, the wind that takes it easy.
Waiehu's wind is the Makani-hooʻeha-ili, the wind that hurts the skin.
Waikapu's wind is the Makani-ko-kololio, the gusty wind.
Waihee's wind is the Makani-kili-ʻoʻopu.
(Rebecca Nuuhiwa, Audio Collection HAW 84.2.1 as quoted in Sterling 1998:62)

The Twin Ponds of Kapiʻioho

On the other side of Kahului Bay are Kanahā and Mauʻoni ponds, sometimes referred to as the "twin ponds of Kapiʻioho," as the banks of these two ponds were said to have been built by Kapiʻiohookalani, who was the *mōʻī* of Oʻahu and half of Molokai (Sterling 1998:87). To build them, he gathered men from Oʻahu, Molokai, and Maui, to pass the stones by hand down a line that ran from Makawela to Kanahā. There were often too many laborers to provide enough food for, which originated the *ʻōlelo noʻeau* (Hawaiian proverb), "Pākāhi ka nehu a Kapiʻioho," which translates to: "the *nehu* [Hawaiian anchovy, *Stolephorus purpureus*] of Kapiʻioho are divided, one to a person." Pukui explained: "Kapiʻioho, ruler of Molokaʻi, had two ponds, Mauʻoni and Kanahā, built on his land at Kahului, Maui. The men who were brought from Molokaʻi and Oʻahu to build the ponds were fed on food brought over from Molokaʻi. The drain on that island was often so great that the men were reduced to eating *nehu* fish, freshwater *ʻōpae* [shrimp], and *poi* [cooked and pounded taro]. The saying is used when *poi* is plentiful but fish is scarce and has to be carefully rationed" (Pukui 1983:2578). Sterling (1998) wrote that even the *nehu* and *ʻōpae* could not always be obtained in a great enough quantity to spread across so many men. When those resources fell short, all the laborers had to eat was seaweed and salt.

Kapiʻiohokalani was killed by Alapaʻinui at the battle of Kawela on Molokai before the ponds were finished, and Kamehamehanui, *mōʻī* of Maui, took up the work of completing the ponds. Although

Kapiʻiohokalani had a son and daughter (Kanahāokalani and Kahamaluihiikeaoihilani), his brother Peleʻioholani became *mōʻī* of Oʻahu after his death. Kapiʻiohokalani's daughter, Kahamaluihi, traveled to Lahaina to find her brother, who she expected to be at the court of Kamehamehanui. When she arrived there, she learned that they had traveled on to Hāna, and so set off again to find them, traveling incognito under the name Mauʻoni. When she arrived in Hāna, she learned that Kamehamehanui had already departed again, traveling back to Kahului to proclaim the *kapu* (taboo, sacred) on the *kuapā* (fishpond wall) of the twin ponds. Kahamaluihi retraced her steps, returning to Kahului, and waited at Kanahā for the expected event. Sterling (1998) related Puea-a-Makakaualii's description of the proceedings as they were recorded in John F.G. Stokes' notes:

> The day was bright and clear, people from far and near came by hundreds, bringing food and supplies." Lanais of rushes and coconut leaves were put up for the king and his court. The wait was not long "for the insignia of the king could be seen at a distance, coming nearer. It must have been a grand sight, for the mighty of the lands was coming with full pomp of royalty—the princess saw them and could make out their persons. She stripped off her paʻu [skirt] and stepped upon the center kuapa of the ponds. Around her waist was flying the *pola* of a white malo called the "malokea" a special malo worn by the high priest of the blood royal. Meanwhile the people shouted out, 'Eia aʻe ke Kapu!' The kapu is broken. (Sterling 1998:87)

Kahamaluihi walked straight to Kamehamehanui, who embraced and welcomed her as the daughter of Kapiʻihookalani. He recognized her to the people as an *aliʻi* of high rank who had the right to tread the *kuapā* of the twin ponds, and gave her the honor of naming them both. Kanahā she named after her brother, Kanahāokalani. The other she gave her incognito name, Mauʻoni (Sterling 1998).

Others attributed the construction of Kanahā to Kiha-a-Piʻilani, at around the same time that Keawenuiaʻumi was traveling to find Pākaʻa (Kamakau 1961, Pukui et al. 1974).

Maly and Maly (2003) translated Moses Manu's account of Kihapiʻilani to Fornander, as published in *Ku Okoa* in 1884. This account described how Kihapiʻilani lived in Kahului after securing his rule over Maui, and built the two fishponds:

> Now when the King (Kihapiʻilani) completed his work in this area, he moved and lived at Kahului, where he began the collection of stones for the *kuapā* of Mauoni and Kanahā. He is the one who caused the water in those two ponds to be separated, and given two names. The *kuapā* is still there to this day, but a large portion of it has been lost, covered under the sands flying in the winds. When this work as completed, Kihapiʻilani then departed for Waiehu and ʻĀʻāpueo… (Manu, as translated by Maly and Maly 2003a:81)

According to Kamakau, Kihapiʻilani and Keawenuiaʻumi encountered each other on Maui while Kihapiʻilani was building the ponds:

> Keawe-nui-a-ʻUmi sailed from Hilo to Kapuʻekahi in Hana and from Hana to Kahului of Wailuku. There the chief of Hawaii met Kiha-a-Piʻi-lani, ruler of Maui. Kiha-a-Piʻi-lani was building the walls of the pond of Mauʻoni. A wide expanse of water lay between Kaipuʻula and Kanaha, and the sea swept into Mauʻoni. The two ruling chiefs met and greeted each other with affection. (Kamakau 1961:42)

Sterling (1998) related that the chiefess Kaipuula and her son Pumaia were the custodians of the fishponds during the reign of Kamehameha I to Kamehameha III. According to Rebecca Nuhiwai,

Kanahā was also home to pre-Contact salt pans. "When the sea rose the hollows in the rocks were filled" (Nuhiwai in Sterling 1998:90).

The Plains of Kamaʻomaʻo

Fornander's (1919) account of the story of Pumaia ends with a prophet being disemboweled by the owl deity, Pueonuiokona, on the plains of Kamaʻomaʻo: Pumaia was killed along with his friend Wakaina in a fight with the shape-shifting spirit, Puukolea. They traveled back to their parents after their death, but were identified as ghosts and chased away by the prophet Pupuilima. Pumaia and Wakaina fled with the prophet in pursuit. When they arrived at the plains of Kamaʻomaʻo, "at the eastern isthmus of Maui, connecting East and West Maui" (Fornander 1919:554), they encountered the owl deity, Pueonuiokona. The prophet explained to Pueonuiokona that he was chasing Pumaia and Wakaina because they were spirits and he wanted to kill them. Pupuilima and Pueonuiokona proceeded to chase Pumaia and Wakaina across the plain, Pupuilima to destroy them and Pueonuiokona to revive them. Along the way, Pupuilima caught Pueonuiokona by the arm and they argued:

> The owl went along slowly until his fellow prophet thundered after him and gave his hand a jerk. Pueo asked, "What wrong has a fellow committed that you should tug at the arm from behind and thereby nearly tripping me?" The other replied with blazing eyes, "Who told you to go after my enemies with the intention of saving them? Why don't you look for your own, and on them practice saving?" The owl replied: "If you excel in strength you can obtain them, but if you are weak you can not have them; because I, even I, am an old resident of this plain. When spirits from the dead arrive I cause them to revive. Also no prophet comes to this plain; this is the first time that I have seen a prophet on this plain, and that is yourself. Because you complained of my desire to give life to those spirits, so be it! By a test of strength will [we know] whether you obtain them or I do." (Fornander 1919:554)

Pueonuiokona was victorious in the fight, and disemboweled the prophet. He scattered his entrails on the ʻ*akōlea* (*Polypodium keraudreniana*), a type of fern that was noted as previously abundant in the area prior to over predation by introduced species (Fornander 1919).

A spirit from the plains of Kamaʻomaʻo also features in the story of Hiʻiakaikapoliopele, when she and Lohiʻau traveled to the chief ʻOlepau's housewarming feast on Maui. When they arrived at ʻOlepau's house, he recognized Hiʻiaka even though she had disguised herself as an old crone. However, ʻOlepau's wives also recognized Hiʻiaka and were worried that she would take their husband. They therefore insisted the crone was not Hiʻiaka, and refused to invite her party into the house. This resolved Hiʻiaka to kill ʻOlepau for this slight. Hiʻiaka then commenced a long battle with ʻOlepau's wives over his life. After ʻOlepau was dead, messengers departed to Molokai and Lānaʻi to retrieve his two brothers, who were chiefs of those islands. However, the messengers learned that ʻOlepau's brothers had died at the same time. ʻOlepau's wives then sent for his priest, Kauakahimaikūlani, to revive him. Hiʻiaka heard this was happening, and told Lohiʻau that if Kauakahimaikūlani revived ʻOlepau, then Hiʻiaka would be the one to die (Nogelmeier 2006).

Kauakahimaikūlani called upon "all of his remaining ʻaumākua, or family guardians, and to the long god, the short god, the assembly of spirits, the line of spirits, the multitudes and legion of spirits and ghosts" (Nogelmeier 2006:314), and asked for their knowledge, power, and strength to help him save ʻOlepau's life. All of the spirits gave their approval to his request, except for one, which was from Kamaʻomaʻo. This spirit answered honestly, that ʻOlepau's life could not be saved by them,

because he was killed by Hiʻiakaikapoliopele. The only way ʻOlepau could be spared was if Kauakahimaikūlani made a plea to Hiʻiaka directly, and if she agreed. The spirit explained:

> But there is a cost for Hiʻiaka to grant what you ask. As for me, a poor ghost from the plains of Kamaʻomaʻo, I tell you that no, ʻOpelu will not be saved by us.
>
> The approval they gave you is because they hunger for the ʻawa, the food, and the fish which you, O priest, would prepare for them when you all arrive at the site of the corpse. (Nogelmeier 2006:315)

The other spirits insulted the dissenter, saying:

> Hah! How awful for some evil little ghost of Kamaʻomaʻo to deny that we can revive ʻOlepau. You are nothing but a shameless moth jumper of Kamaʻomaʻo! We may just kill you like a worthless outcast, you sunburned, wrinkled up ghost (Nogelmeier 2006:315)

The spirit was not deterred by their words, and acknowledged Hiʻiaka as its guardian. When Kauakahimaikūlani pled for ʻOlepau's life, Hiʻiaka explained that she could no longer revive him, and that if she did, she and the priest would both die.

Beckwith (1940) provided an account of Kahaʻi-nui, an East Maui chief who traveled "the path of the rainbow," either in search of his father Hema, whose eyes were gouged out while on an expedition to foreign lands, or to avenge his father's death. Kahaʻi was buried in ʻĪao Valley, "on the plains of Kahului" (Beckwith 1940:249).

Pihana Heiau

Pihana Heiau is a *luakini* (*heiau* with offerings of human sacrifice) complex said to have been built by Kahekili. Many of the written historical sources regarding these two *heiau* were never published; however Sterling (1998) compiled information from Bishop Museum and other archival sources on Pihana and Halekiʻi Heiau, including archaeological descriptions, *moʻolelo*, and other historical documentation. The following description of these *wahi pana* (legendary places) is summarized from Sterling's compilation.

Puea-a-Makakaualii related the story of Pihana Heiau to Stokes, described as "Pihanaakalani, wherein is the heiau of Halekii, Liliha and Kalola—Luakini" (Sterling 1998:75). According to this account:

> Kiikewa, the high chief who lived at "the time of Kakae; the king of West Maui, built the Heiau of Pihana—every rebellious high chieftains of Maui were sacrificed at this heiau, but, no alii whose lineage was tainted were sacrificed on its alter [sic]; Liliha is the name of the Luapaʻu (offal pit). Halekii is the heiau reserved for the females of high rank and is situated on the makai side of the bluff—Kalola is another name. The whole combined in general is Pihana. It is said there is a cave beneath Pihana, and Liliha is the mouth of the cave. (Sterling 1998:75-76)

The account also described how Poloahilani was the last to be sacrificed at Pihana, under Kamehameha I, prior to its destruction by Kalanimakakaualii in 1819. After the battle of Hāna,

Kamehameha I traveled to Naholo-ku (Kaupo) to visit Kalanikaukooluaole, one of Kamehamehanui's daughters. On his way there, he saw a woman bathing at the stream and asked for directions to Kalanikaukooluaole's house. The woman directed Kamehameha to the house, but when he arrived, he was told that the princess was bathing at the stream. Kamehameha found this deception to be an insult, and sent for Kalanikaukooluaole to be sacrificed at Pihana after the battle of Iao. Poloahilani went instead, in order to save the life of the princess:

> Poloahilani with her attendant took the road through Hamakualoa, reaching Wailuku on the eve of the last Kaloa and in time for the kapu heiau. Thus she was sacrificed at Pihana heiau to appease the gory thirst of the war god of Kamehameha I, the slayer of chiefs. The princess, accompanied by the priest, took the long route through Kahikinui, reaching Wailuku after the kapu was free. She lived incognito, burying her identity with the monument of an ahu at Lamalii, Wailuku. (Sterling 1998:76)

Stokes' description of the *heiau* is related by Sterling (1998) via Winslow Walker's unpublished manuscript on the archaeology of Maui:

> Location: West side of Iao Stream on the sand ridge about half a mile from the sea, about opposite the Wailuku Sugar Co.'s mill.
>
> Description: A large heiau partly eroded away by the action of Iao Stream. Stokes in 1916 described it as follows: "This heiau occupied the top and upper slopes of a high lime-sand-dune, its floor being about 70 feet above the stream bed on the Southeast. The dune is one of a series paralleling the coast line of Wailuku bight. The dunes on the west, on one of which Pihana stands, are hardened on the surface for a depth of 2 to 6 feet, the underlying sand being loose. Probably since the heiau was built, floods in the Iao stream (the bed of which was formerly more to the southeast) have cut through the hardened portion of the base of the Pihana dune, and are now gradually removing it together with the heiau…the southwestern end of the dune is very precipitous, the floor of the heiau being about 60 feet above the ground at the foot of the terraces. The only local information obtainable was that the heiau had been built by Kahekili. (Sterling 1998:76)

Stokes' notes record encountering human, pig, and fish bones, *ʻiliʻili* (smooth pebbles), and to the southwest, graves marked by stones from Pihana (Sterling 1998:77).

Walker reported two image posts that were "dug up in a field near Paukukalo beach" (Sterling 1998:78), which he believed likely belonged to Pihana or its vicinity. He observed that both had been burned, perhaps as a result of the overthrow of the *kapu* system in 1819 (Sterling 1998).

3.3.3 ʻŌlelo Noʻeau

A number of *ʻōlelo noʻeau* refer to Wailuku, and especially to the battles that occurred there:

> 19. Ahulau ka Piʻipiʻi i Kakanilua.
> *A slaughter of the Piʻipiʻi at Kakanilua*
> In the battle between Kahekili of Maui and Kalaniʻōpuʻu of Hawaiʻi, on the sand dunes of Wailuku, Maui, there was a great slaughter of Hawaiʻi warriors who were called the Piʻipiʻi. Any great slaughter might be compared to the slaughter of the Piʻipiʻi.

1675. Ke alanui pali o ʻAʻalaloa.
The cliff trail of ʻAʻalaloa.
A well-known trail from Wailuku to Lahaina.

1711. Ke inu aku la paha aʻu ʻĀlapa i ka wai o Wailuku.
My ʻĀlapa warriors must now be drinking the water of Wailuku.
Said when an expected success has turned into a failure. This was a remark made by Kalaniōpuʻu to his wife Kalola and son Kiwalaʻō, in the belief that his selected warriors, the ʻĀlapa, were winning in their battle against Kahekili. Instead they were utterly destroyed.

2300. Na wai ʻehā.
The four wai*.*
A poetic term for these places on Maui: Wailuku, Waiehu, Waiheʻe, Waikapū, each of which has a flowing water (*wai*).

2647. Pili ka hanu o Wailuku.
Wailuku holds its breath.
Said of one who is speechless or petrified with either fear or extreme cold. There is a play on *luku* (destruction). Refers to Wailuku, Maui.

2912. Wailuku i ka malu he kuawa.
Wailuku in the shelter of the valleys.
Wailuku, Maui, reposes in the shelter of the clouds and the valley.

2923. Wehe i ka mākāhā i komo ka iʻa.
Open the sluice gate that the fish may enter.
This was uttered by Kaleopuʻupuʻu, priest of Kahekili, after the dedication of the *heiau* of Kaluli, at Puʻuohala on the north side of Wailuku, Maui. A second invasion from Kalaniōpuʻu of Hawaiʻi was expected, and the priest declared that they were now ready to trap the invaders, like fish inside a pond. The saying refers to the application of strategy to trap the enemy.

Three *ʻōlelo noʻeau* reference Kahului:

1722. Ke kai holu o Kahului.
The swaying sea of Kahului.
Refers to Kahului, Maui.

2351. Nūnū lawe leka o Kahului.
Letter-carrying pigeon of Kahului.
In 1893, carrier pigeons arrived at Kahului, Maui. One was brought to Honolulu and released with a letter tied to its neck. It flew back to Kahului. This was of such great interest to the people that a song was written and a quilt design made to commemorate the event.

2578. Pākāhi ka nehu a Kapiʻioho.
The nehu *of Kapiʻoho are divided, one to a person.*
Kapiʻioho, ruler of Molokaʻi, had two ponds, Mauʻoni and Kanahā, built on his land at Kahului, Maui. The men who were brought from Molokaʻi and Oʻahu to build the ponds were fed on food brought over from Molokaʻi. The drain on that island was often so great that the men were reduced to eating *nehu* fish, freshwater *ʻōpae* and *poi*. The saying is used when *poi* is plentiful but fish is scarce and has to be carefully rationed.

3.3.4 Settlement and Land Use

Inez Ashdown described the landscape and cultural significance of Na Wai Ehā for *Ha'ilono Mele* in 1976:

> Na Wai Ehā, the Four Waters, include Wai-ka-pu Valley, waterfalls and stream, the Forbidden or Sacred Valley. Wai-luku is the Destructive Waters of I-a-o Valley whose stream is best known as Wai-aka-ma-kea or Waters of Light and Shadow. Wai-ehu is the Valley of Misty Waters; and Wai-he'e is the Valley of Racing Waters. All this area on the eastern slope of west Maui, whose name is Mauna-Ka-Hala-Wai, or Mountain Blessed with Waters, was farmed diligently in olden times. With the produce from these lovely gardens, and the fat fish from the ponds of Kana-hā and Mau'oni at Kahului and their counterparts at Ke-alia of Ka-lepo-lepo on Ma'alaea Bay, the people of Maui were rich and happy. Here, many temples were built for prayer, ceremonials, and, finally, some were rededicated as war temples. (Ashdown 1976:5)

Ashdown observed that although some small *kalo* (taro; *Colocasia esculenta*) patches remained active, the lands of Na Wai Ehā had largely been transformed by sugarcane production for the Wailuku Sugar Company. Handy (1940) further contextualized Wailuku within the broader context of Na Wai Ehā, noting that much of the city development in Wailuku was built up on agricultural terraces:

> This is the third of "The Four Streams", the great torrent that drains the highest cloud-capped uplands of western Maui through deep Iao Valley. Much of the upper section of what is now the city of Wailuku is built on old terrace sites. Along the broad stream bed of Iao Valley, extending several miles up and inland, the carefully leveled and stone-encased terraces may be seen. In the lower section of the valley these broad terraces now serve as sites for camps 10 and 6 of Wailuku Sugar Plantation, being utilized for house sites, gardens, playgrounds, and roads. A little farther up, neat private homes and vegetable and flower gardens cover these old taro terraces; while at their upper limit the terraces are submerged in guava thickets. Here a few wild taros were found, but I saw no terraces in Iao or Wailuku being used as flooded taro patches. It is significant that here, as at Waihee, the old terraces are adapted to market gardening (Chinese bananas, vegetables, and flowers) by Japanese and Portuguese gardeners. (Handy 1940:108)

According to Handy (1940), sweet potato was the dominant cultivar in Wailuku, with sweet potato plantations and fishing settlements lining the north coast of Maui, heading east from Wailuku. He identified a local variety of sweet potato called Kahului, which carried a strong resemblance to *Mauna pohaku*, an introduced variety of sweet potato known to be quick growing and hardy. He also observed that in Wailuku, bananas were sometimes planted in the dryland terraces and plentiful breadfruit and coconut cultivated in the valley bottoms.

Wilkes (1845) described the district of Wailuku as having "extremely rich and well watered" soil in the valley lands, with the upland soils also proving productive wherever there was sufficient water. While he identified extensive woodland areas in Wailuku, he noted that the trees were large but not the kind to produce viable lumber.

Tanaka and Hammatt (2020) identified two named *'auwai* (ditches), Kalaniauwai and Kamaauwai, which irrigated taro on the irrigated plains around the Wailuku River. The fertile agricultural terraces around 'Īao Valley and the Wailuku River form a strong contrast with the Pleistocene aeolian sand dunes of the isthmus. The majority of this central belt falls within either Waikapu or

Wailuku. Tanaka and Hammatt (2020) speculated that this was perhaps a political maneuver to control valuable resources around Kahului Bay, which could have included locally-available marine resources as well as "drift resources" such as drift logs from the Pacific Northwest, whale ivory, iron from ships or flotsam (Tanaka and Hammatt 2020).

Marine resources were abundant in the area around Kahului Harbor. Kahaulelio described a method of net fishing called *kolo*, which he had observed in Hilo and in Kahului. The method was best adapted to sandy places, and would not work in areas where the sea bottom was rocky. Kahaulelio described watching this fishing method in Hilo and Kahului:

> This net resembles the side curtain nets of the huge bag net, except that they are small and this is big and long. One end is drawn up at Waiolama and the other at Nukuokamanu. I have heard from the people of Hilo that it is employed for even the small *nehu* [anchovy; *Encrasicholina purpurea*] fish. True, in this kind of fishing, sharks, *kawakawa* [bonito; Scombridae], *omaka* [jackfish; Carangidae], and all kinds of fish are caught and when I saw those of Hilo at their work, they chanted *hula* songs as they drew in their nets. I did not memorize them as I was in Hilo only a short time. So it was at Kahului and other sandy places where the nets would not be snagged. Thus the *laukapalili* fishing with draw nets for *oio* [bonefish; *Albula vulpes*] fish was done. (Kahaulelio as translated by Maly and Maly 2003a:137).

A 1905 report on the commercial fisheries of the Hawaiian Islands identified Kahului as a primary fishery, with a railroad network that distributed the fish caught at Kahului to Wailuku, Spreckelsville, and Keia, indicating the abundance of marine resources in Kahului persisted into the post-Contact period (Cobb 1905). Tanaka and Hammatt (2020) observed that the shallow calcareous reef on the coastline of Kahului provided shelter for octopus and the juvenile stages of larger pelagic fish, including *ʻulua* (giant trevally; *Caranx ignobilis*).

3.3.5 Early Post-Contact Period

Famous Battles of Wailuku

During the early post-Contact period, a designation commonly given to the period following the 1778 arrival of Captain James Cook at Waimea Harbor on Kauaʻi, the *mōʻi* of Maui, Kahekili was in an ongoing battle with Kalaniʻōpuʻu, the ruler of Hawaiʻi Island, and Wailuku became the backdrop for much of the fighting. On the sand hills of Kakanilua, just inland of what is known today as Kahului Harbor, a great battle between Kahekili and his warriors and Kalaniʻōpuʻu ensued, and Kalaniʻōpuʻu's forces were nearly annihilated. Kamakau (1961) described the vision of Kalaniʻōpuʻu's elite ʻĀlapa and Piʻipiʻi warriors marching across the plain of Kamaʻomaʻo:

> There were 800 of them, all expert spear-point breakers, every one of whose spears went straight to the mark, like arrows shot from a bow, to drink the blood of a victim. Across the plains of Puʻuʻainako (Cane-trash-hill) and Kamaʻomaʻo shone the feather cloaks of the soldiers, woven in the ancient pattern and colored like the hues of the rainbow in red, yellow, and green, with helmets on their heads whose arcs shone like a night in summer when the crescent lies within the moon. (Kamakau 1961:85)

After the battle, the dunes were reportedly littered with the bones of fallen warriors. As Kamakau (1961:85-86) described, "There the dead lay in heaps strewn like *kukui* [candlenut; *Aleurites*

moluccanus] branches; the corpses lay heaped in death; they were slain like fish enclosed in a net." Indeed, after Kaluli Heiau was completed, the priest Kaleopuʻupu told Kahekili, "This is the house of your god; open the sluice gate that the fish may enter" (Kamakau 1961:85). Just before the battle commenced, Kaleopuʻupu remarked: "The fish have entered the sluice; draw in the net" (Kamakau 1961:86).

Two of Kalaniʻōpuʻuʻs men escaped to report on the destruction of this first day of battle. Shocked by the swiftness of their defeat, Kalaniʻōpuʻu prepared for a second day of battle with Kahekili. Kalaniʻōpuʻu assumed the battle would once again take place at Kakanilua, but instead Kahekiliʻs men rose early and divided their forces between the plains of Kamaʻomaʻo and the Waikapu turn, forming a trap for Kalaniʻōpuʻu:

> The plains of Kamaʻomaʻo became like a fishpond through whose sluice gate the sea flooded, Kalaniʻōpuʻuʻs men [became] like the mullet driven by the sound of beating into the sluice gate of ʻUkoʻa; and the sea rose up to the walls. (Kamakau 1961:87)

This great battle became known as "*Ahulau ka Piʻipiʻi i Kakanilua*," or "Slaughter of the Piʻipiʻi at Kakanilua." The fighting only lasted for the two days, after which Kalaniʻōpuʻu asked for peace and returned to Hawaiʻi Island.

Contact with the West introduced previously unseen means of warfare like muskets and cannons, which Kamehameha I brought to bear on Maui during the Battle of ʻĪao in 1790. Although Kahekili was still the chief of Maui during this time, he was on Oʻahu during the battle, leaving his son, Kalanikūpule in charge. Kamakau described the infamous battle, also known as the "Battle of Kepaniwai," or "the damming of the waters":

> The bay from Kahului to Hopukoa was filled with war canoes. For two days there was constant fighting in which many of the most skillful warriors of Maui took part, but Kamehameha brought up the cannon, Lopaka, with men to haul it and the white men, John Young and Isaac Davis, to handle it; and there was great slaughter. Had they fought face-to-face and hand-to-hand, as the custom was, they would have been equally matched. But the defensive was drawn up in a narrow pass in ʻIao, and the offensive advanced from below and drew up the cannon as far as Kawelowelo'ula and shot from there into ʻIao and the hills about, and the men were routed. The victors pursued them and slew the vanquished as they scrambled up the cliffs. There was a great slaughter, but mostly among the commoners; no important chief was killed in this battle. "Clawed off the cliff" (Ka-ʻuwaʻu-pali) and "The damming of the waters" (Ka-pani-wai) this battle was called. (Kamakau 1961:148-149)

Kahekili continued to battle with Kamehameha until his death in 1793, at which time he was succeeded by Kaʻeokulani (Kahekili II), who himself died in battle the following year and was succeeded by Kalanikūpule. In 1795, Kamehameha I defeated the combined forces of Oʻahu and Maui, and in 1810 negotiated peace with Kaumualiʻi of Kauaʻi, thereby unifying the archipelago under his rule (Kamakau 1961).

Western Accounts

Captain Cookʻs arrival to the Hawaiʻi Islands in 1778 demarcated 'Contact' between Europe and Hawaiʻi. Cook sighted the island of Maui on November 26, 1778, though he did not land there. He described Kahului as follows:

> In the country was an elevated saddle hill, whose summit appeared above the clouds. From this hill, the land fell in a gentle slope, and terminated in a steep rocky coast, against which the sea broke in a dreadful surf. Finding that we could not weather the island, I bore up, and ranged along the coast to the Westward. It was not long before we saw people on several parts of the shore, and some houses and plantations. The country seemed to be both well wooded and watered; and running streams were seen falling into the sea in various places. (Speakman 1978)

The arrival of American Protestant missionaries to Hawai'i's shores provides another record of Western experiences in the archipelago. In 1832, Reverend Jonathan Smith Green founded the Wailuku Mission Station. Joseph Tracy described Wailuku during this time as, "a tract of country containing more than 25,000 souls…At Wailuku, a school-house was erected, 118 feet long and 40 wide, capable of holding 2,000 persons…" (Tracy 1840:231). In 1835, Miss Lydia Brown arrived at Wailuku and began to teach spinning, weaving, and knitting, which resulted in some cotton being planted in Wailuku for this purpose. By 1837, a number of schools had been established across the islands, including a central school for girls in Wailuku (Tracy 1840).

Krause et al. (2020)observed that there are few records from early explorers and merchants at Kahului, perhaps because they preferred to land on the more protected southern coastline. The explorer Charles Wilkes observed a tidal wave during his time in the Hawaiian Islands, which he observed had been significantly more destructive for the north side of Maui Island than the south, and which had entirely swept the village of Kahului away:

> The inhabitants of Kahului, on seeing the sea retiring, rushed to the reefs with great joy to secure the fish, but before they could reach them the sea-wave came rolling in, like an extended wall, to bury and destroy all their habitations, or sweep them away. Only two lives, however, were lost there, while at Hilo there were twelve persons missing. (Wilkes 1845:244)

Wilkes also documented his horse ride from the west side of the island to visit the women's seminary in Wailuku. He described the isthmus area to be "a plain nearly uninhabited, and hardly susceptible of cultivation, until within a mile of Wailuku" (Wilkes 1845:256). Wilkes found the living conditions of the school to be sparse and unsanitary, and observed that several of the girls had died at the school. Reverend Greene, who was in charge of the school at the time of Wilkes' visit, also took Wilkes to see the sugar mills and taro plantations in Wailuku. Wilkes observed that foreign interests appeared to have deceived and defrauded the king and chiefs in establishing these industries, and that the former had set themselves up to profit at the latter's detriment. Wilkes detailed his observations of Wailuku during this trip:

> We now rode down the valley among the taro-patches and over to the Sand-hills. In passing over them we saw some remarkable concretions, resembling large tunnels or broken pipes, which were quite hard, and resembled solid rock interspersed with amorphous sandstone. Mr. Greene, who was with us, could give me no information respecting their formation. Dr. Pickering met with these also, and considers them as mineral concretions, although they appeared to him to resemble those formed by annelidæ, or like beds of sabellæ.
>
> On the isthmus, the sand was drifting like snow, and afforded a good illustration of the rapidity with which it changes its place by the effects of the winds.

> In the centre of the Sand-hills, we stopped on a mound of human bones,--a perfect Golgotha. There appears to be no tradition respecting this accumulation of mortal relics. By some it is supposed to have been a burying-place after a battle, for the place where they were found was known to be a battle-ground. Bloody contests, indeed, must have taken place here, if we are to judge from the number of skeletons which are exposed. Some of these are in a state of perfect preservation, and I regretted not being able to transport one to the ship.
>
> Near this place we saw several boys anxiously watching some object, and on getting near them, found they were employed in catching birds. This was done by baiting small sticks, to which a string was tied, and the other end of the string fastened to a small stone: the bird swallows the stick along with the bait, and in attempting to fly off, it pierces his throat, and he is thus secured. (Wilkes 1845:260)

The missionary census of 1831-32 recorded a total population of 2,256 men, women, and children within Wailuku Ahupuaʻa. By 1836, the population had declined to 1,364 people within the *ahupuaʻa* (Schmitt 1973). The demographics of the area would continue to shift into the later post-Contact as foreign diseases took significant toll on the Hawaiian population, and land privatization and industrial interests further nucleated settlement into areas like mill camps and port towns.

3.3.6 The Mahele

During the Mahele, the entirety of Wailuku Ahupuaʻa was designated as Crown Land (Figure 58). On the passing of Lot Kapuāiwa (Kamehameha V), the *ahupuaʻa* passed to his half-sister, Ruth Keʻelikolani. In 1882, Keʻelikolani sold a portion of these lands to Claus Spreckels, who continued to consolidate his landholdings in Wailuku for commercial sugarcane production. Most of the LCAs awarded in Wailuku are located in the northern and western portions of the *ahupuaʻa*, in the flood plains of ʻIao Valley. A smaller number are clustered closer to the shore, just north of the project area. Many of the LCAs near the project area were awarded as land deeds by Kamehameha IV. Krause et al. (2020) suggested that the absence of LCAs *mauka* (inland) of the project area indicated a continued avoidance of the "Sand Hills," at least as an area for habitation or agriculture.

A portion of the project area lies within LCA 420, awarded to H. Kuihelani. A letter dated April 23, 1851 from H. Kuihelani to the President of the Land Commission indicated that they had not yet received their award document for "our land area in Wailuku, named Owa," and requesting it be delivered "in the hand of Armstrong" (Survey Notes, DLNR Archives, as translated by Frances Frazier; accessed via Kīpuka). Several Native and Foreign Testimonies were provided for this LCA. The Foreign Testimony by Kaauwai provides some context for this parcel and the ownership rights:

> I Kaauwai sworn. I know the lands of Owaa. Claimed by Kuihelani at Maui. It formerly belonged to Auwae, who held it as Konohiki for Kamehameha I.
>
> He continued to hold it in peace under Kamehameha I, II, and III up to the year 1831, when he died.
>
> Auwae had great fears, lest when he died, his heirs, and the people should be dispossessed of this land; and consequently he laid up money to buy the good will of the King, that the land might not be wrested from the lawful heirs. After Auwae died, Kauailepolepo, nephew of Auwae, took 20 dollars (money laid up by Auwae) to the King, and Kauo, the widow of Auwae, and Kauailepolepo were left in possession of the land.

> In 1838 Kalauwalu prevailed upon the King to return the 20 dollars before spoken of & Kalauwalu was placed over the land by the King. Kalauwalu had this land given to him by the King in time of Kaome; but the King would not dispossess Auwae. When Auwae died Kalauwalu renewed his claim, and upon the removal of Kawailepolepo in 1838, came into possession. In 1839, Kalauwalu died and his widow had been the konohiki of the same from that time until her death in February last. Her name was Kaunaohua. Since her death, the land has referred to the King.
>
> (Foreign Testimony by Kaauwai, accessed via Kīpuka and transliterated by Swift with apologies for any errors in names, form, or content)

The testimony makes it clear that these expansive lands were lived on and worked not just by an individual family, but by many people who the King and *konohiki* took care not to dispossess through these transitions in land ownership.

3.3.7 Commercial Sugarcane Agriculture in Wailuku

Understanding the history of post-Contact land use on Maui requires an examination of the major sugarcane agriculture plantations that emerged in the mid- to late-1800s and their battles over land and water rights. Early sugarcane production efforts in Wailuku included a mill established in 1823 by an Italian named Antone Catalina, and a mill and plantation established at around the same time by Atai, a co-owner of Hungtai Company in Honolulu with his brother Ahung (Jones and Osgood 2015). In the mid-1860s, the American Civil War disrupted sugar supply from the American south, significantly increasing demand for sugar from Hawai‘i and leading to a proliferation of sugar plantations, many of which took root on Maui.

1876 was a pivotal moment for the burgeoning sugar industry, as the signing of the Reciprocity Treaty eliminated the 40% tariff on sugar entering the U.S. from Hawai‘i, in exchange for the use of Pearl Harbor as a refueling station. Though the high sugar demand initially sparked by the Civil War had waned, the major boost to profits from the treaty caused another surge, with 14 new plantations emerging on Maui over the next three years. Population became increasingly more centralized and urbanized as expanding plantation lands began to encroach on smaller farms and villages. A multi-ethnic plantation workforce developed as people arrived from China, Japan, Germany, Norway, Portugal, Spain, and other Pacific Islands as contract laborers (Jones and Osgood 2015). An 1879 map by Monsarrat shows a relatively bare Kahului coastline during these early years (Figure 79). Kahului town would develop alongside—and as a necessary companion to—the growing sugarcane industry.

Water availability and water rights were a cornerstone of development and ongoing conflict for and among sugar plantations, particularly those in the leeward areas that received less rainfall. The promise of greater profits from the Reciprocity Treaty offset the risk of investing in large-scale irrigation infrastructure. The Hāmākua Ditch, a 25-mile-long ditch that would bring water from the slopes of Haleakalā and across the Māliko Gulch to irrigate the Hā‘iku Sugar Company fields was proposed by Alexander and Baldwin in 1876. The Kingdom accepted the proposal, on the condition that the ditch would be completed within two years (Jones and Osgood 2015).

Around this same time, Claus Spreckels arrived in Hawai‘i and began currying favor with King Kalākaua for land and water rights to establish his own sugar plantation. In 1878, Spreckels purchased 16,000 acres of the Waikapu Commons and leased 24,000 acres of Wailuku Commons

Crown Lands for $1,000 per year (this was later granted to Spreckels fee simple by the legislature) and began the Hawaiian Commercial Company. Spreckels was quickly, and controversially, granted water rights for his new plantation, with a provision that could allow Spreckels to claim the water sought by Alexander and Baldwin in the building of their Hāmākua Ditch. According to Wilcox (1996):

> Spreckels lost no time petitioning the government for water rights to irrigate his new plantation. Kalakaua, in one of the most controversial acts of his reign, and after a late-night meeting with Spreckels and others in a hotel, sent a messenger at two in the morning dismissing his cabinet and installing a new one. This new cabinet granted Spreckels his water rights the following week. A loan from Spreckels to the king was executed that same day.
>
> A most revealing provision of the lease gave Spreckels the right to all water not already in use at a certain date (30 September 1878)—a date that corresponded with the completion requirement for the Hamakua Ditch. This meant that if Alexander and Baldwin's Hamakua Ditch was not finished on schedule, Spreckels could lay claim to that water and possibly the Hamakua Ditch as well. (Wilcox 1996:61)

Alexander and Baldwin completed the Hāmākua Ditch just before their September 30 deadline. Spreckels turned his attention to building the Haiku Ditch (also called the Spreckels Ditch) to bring water to his lands in Wailuku and Waikapū. Wilcox writes, "His 1879 Haiku Ditch was almost twice as long, three times as large, carried half again more water, and was six times the cost of the 1878 Hamakua Ditch" (Wilcox 1996:62). Spreckels continued developing his financial interests in Wailuku with the construction of a "large, multistacked sugar factory," which Jones and Osgood (2015:60) described as "a modern marvel with the first electric lights and 5-roller mill in the Kingdom." The Spreckelsville community and a plantation railroad followed. In 1882, Spreckels reorganized the Hawaiian Commercial Company into the Hawaiian Commercial and Sugar Company (HC&S). In the same year, Spreckels built the Waihee Ditch (also called the Spreckels Ditch) a 15-mile-long ditch that transported water from the Waihee Stream to HC&S's Waiʻale Reservoir in the *ʻili* (smaller land division within an *ahupuaʻa*) of Kalua within Wailuku. With the two Spreckels Ditches established, the HC&S plantation became the first to be irrigated with water from both East and West Maui (Wilcox 1996). An 1893 map of the Spreckelsville Plantation shows the ditches and reservoirs, as well as roads, railroads, and other infrastructural features developed for the plantation. The "road across sand hills" intersects with the northernmost portion of the project area (Figure 80).

HC&S continued to grow, and Spreckels' personal debts mounted as he invested further into the company. In 1893, HC&S was no longer able to service its debts and declared bankruptcy, at which point the company was taken over by its bondholders. In 1898, HC&S was purchased by Alexander & Baldwin, cementing their hold as one of the Big Five (Jones and Osgood 2015).

In the meantime, Wailuku Sugar Company was also rapidly growing in the wake of the Reciprocity Treaty. The Wailuku Sugar Company was founded in 1862 by James Robinson & Company, Thomas Cumins, J. Fuller, and C. Brewer & Company in response to the increased Civil War-era sugar demand. In 1864, the business was taken over by C. Brewer & Company, and incorporated in 1875 (Wilcox 1996). In 1976, Wailuku Sugar Company was one of three sugarcane plantations operating in ʻĪao Valley: Wailuku Sugar Company, Bal & Adams, and Waikapū Sugar Company. These plantations irrigated their sugarcane fields by diverting water from the Wailuku River, which caused a significant amount of conflict and litigation. In 1877, Wailuku Sugar Company acquired Bal

& Adams, as well as 420 acres of the Bailey Brothers Plantation. In 1894, they purchased Waiheʻe Sugar Company and Waikapū Sugar Company (Jones and Osgood 2015). This expansion brought them into conflict with HC&S over the rights to water in Spreckels' Waiheʻe Ditch: Wailuku Sugar Company argued that Spreckels did not have a proper right-of-way access to run the ditch through what was now Wailuku Sugar Company land, and they further contested his right to the waters of Waiheʻe Stream. This conflict did not reach a resolution before HC&S transferred ownership to Alexander & Baldwin. In 1904, a second ditch (Waiheʻe Canal) was built to divert water from Waiheʻe Stream, and an interim water sharing arrangement was reached between the two companies, which later became permanent:

> …HC&S got five-twelfths of the new Waihee Canal water and one-half of the older Waihee (Spreckels) Ditch water; maintenance cost for these ditches was shared in the same proportion. Further, HC&S got all surplus water from all ditches and 100 percent of the water from the South Waiehu Ditch. The Happy Valley development tunnel was shared by both plantations, but HC&S got first draw. Waihee water went to HC&S by way of the Spreckels Ditch from 7 pm to 5 am each night. Also, HC&S relinquished 9693 acres of land in Waikapu, Maalaea, and Wailuku to Wailuku Sugar Company. With these issues resolved, Wailuku Sugar undertook the Waihee Canal. (Wilcox 1996:122)

This arrangement allowed both the Wailuku Sugar Company and HC&S to continue to operate successfully in Maui. In 1902, HC&S built the Puʻunēnē Mill, which was claimed to be the largest sugar mill in the world at the time. Jones and Osgood (2015) 500-600 narrow-gauge train cars were hauling cane to the new mill to be processed each day, and over 300 cars of raw sugar were taken daily to the wharf to be exported to California for refining. In 1908, Alexander and Baldwin formed the East Maui Irrigation Company (EMI) to develop and manage surface water, and continued to expand the water sources diverted to irrigate sugarcane fields. By the early 1920s, "East Maui Irrigation's ditch system soon included 388 separate intakes diverting water from streams and other sources, 50 miles of tunnels, 24 miles of ditches, 12 inverted siphons (that carried water down into gorges and back up the other side, where they emptied into canals or tunnels), numerous flumes that carried water straight across smaller gorges, several small reservoirs and dams, and 62 miles of private roads to access the system" (Jones and Osgood 2015:110). By 1931, HC&S was growing around 32% of the total sugar crop for all of Hawaiʻi (Wilcox 1996). A 1925 survey map by E.D. Baldwin shows the mauka portion of the project area in lands owned by HC&S (Figure 81).

The sugar industry began to decline in the 1970s as raw sugar prices did not keep pace with labor costs. The conversion from furrow irrigation to drip irrigation, which significantly reduced the labor required to cultivate sugarcane, allowed the larger plantations to continue to operate through the 1970s, and some into the 1990s. Wailuku Sugar Company went out of business in 1988, and HC&S took over some of their land and water allocations. When the Pioneer Mill Company closed in 1999, HC&S became the only remaining plantation on Maui. In 2010 with the closure of Gay & Robinson on Kauaʻi, HC&S became the last sugar plantation still in operation in the entire state (Jones and Osgood 2015). In January 2016, Alexander & Baldwin Inc. made the decision to shut down the 36,000-acre HC&S by the end of that year (Gomes 2016). Figure 82 shows a selection of post-Contact features in Wailuku Ahupuaʻa, the majority of which are in some way related to the post-Contact sugarcane industry that left an indelible mark on this region.

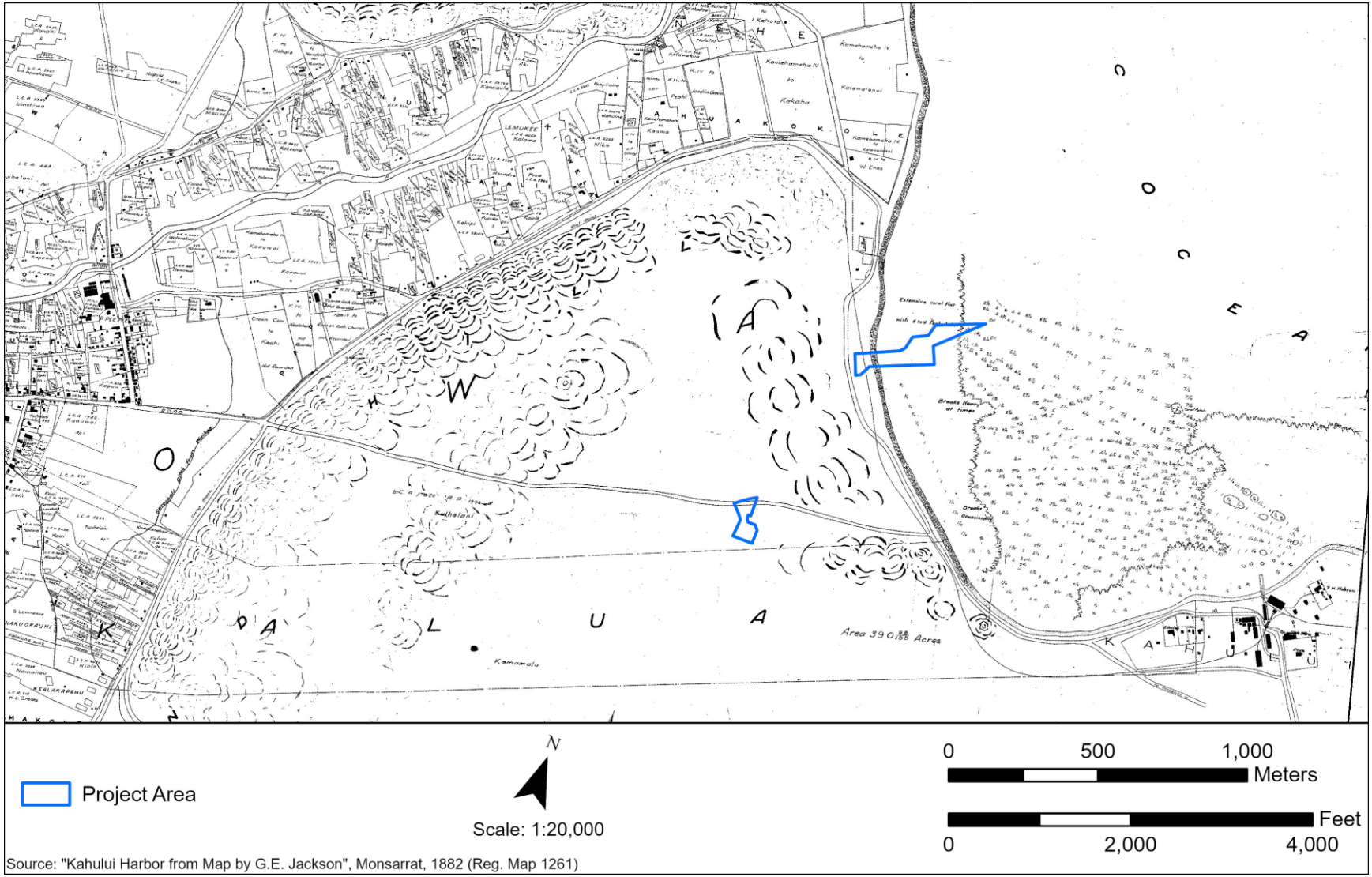


Figure 78. An 1882 map by Monsarrat (RM 1261) showing LCAs primarily located to the northwest of the Maui portions of the HIFL project area. A portion of the project area lies within LCA 420 (not shown), awarded to Kuihelani.

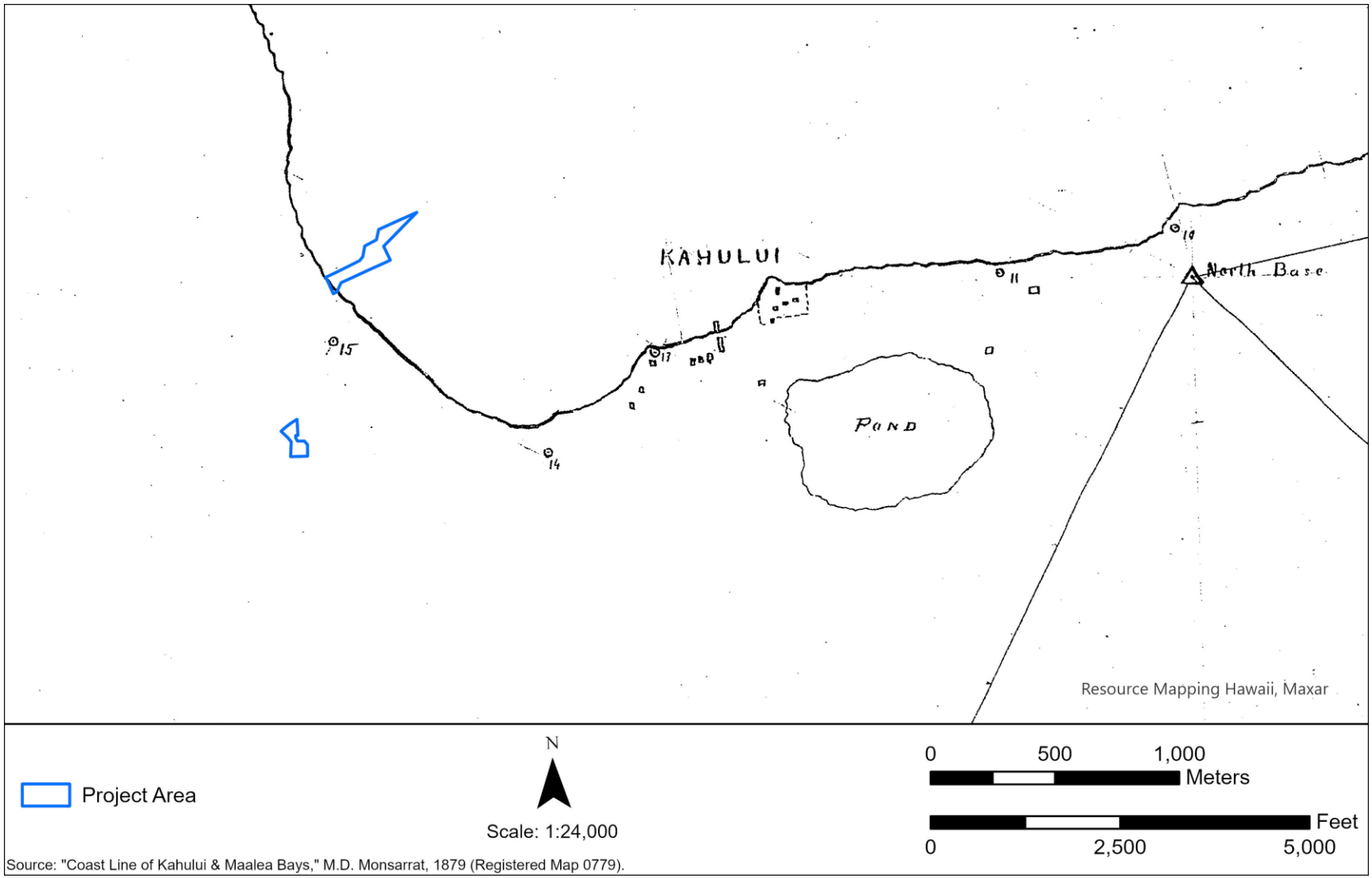


Figure 79. An 1879 map by Monsarrat, showing a relatively bare Kahului coastline during the early years of the sugar boom with the Maui portions of the HIFL project area depicted.

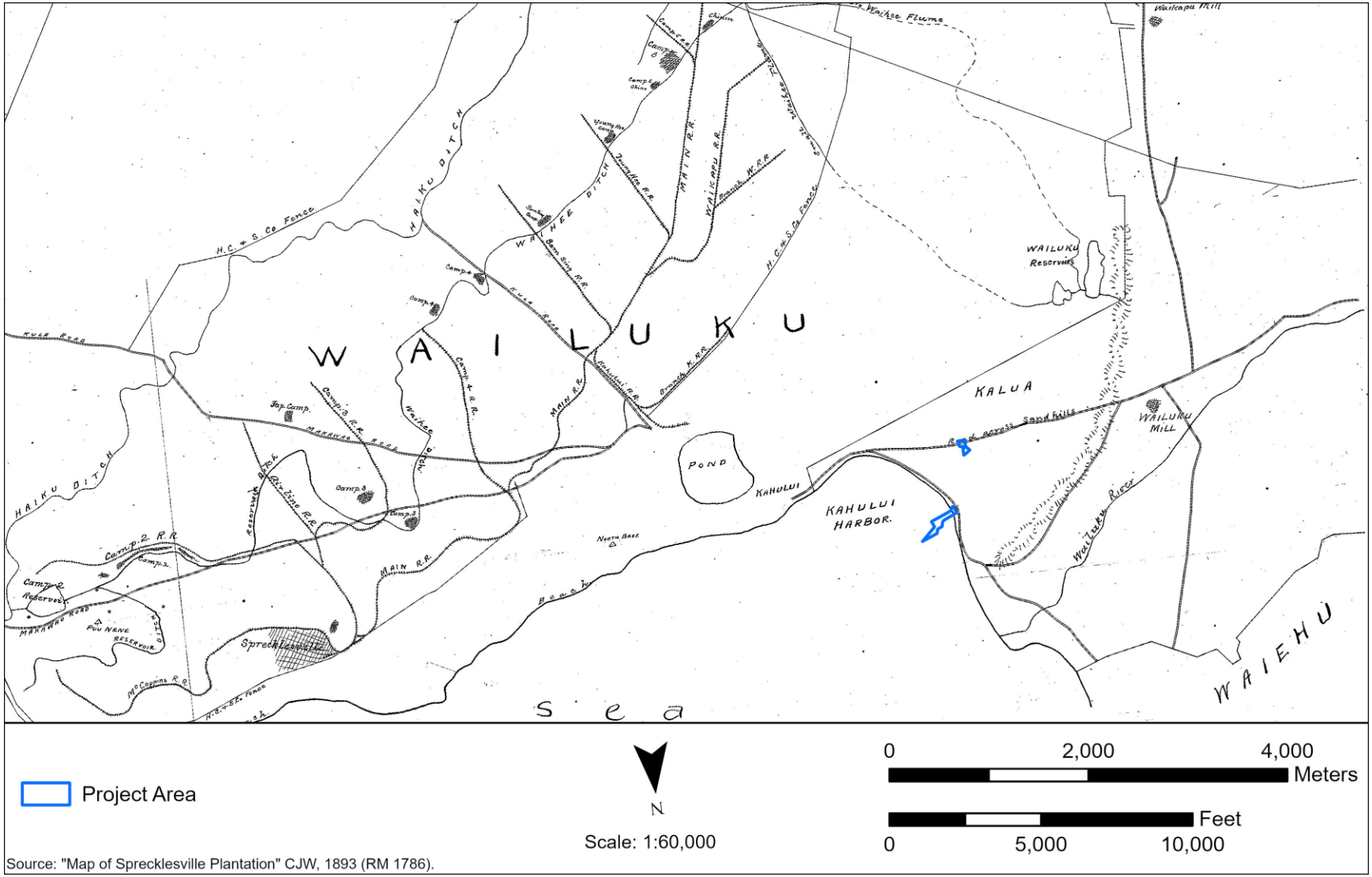
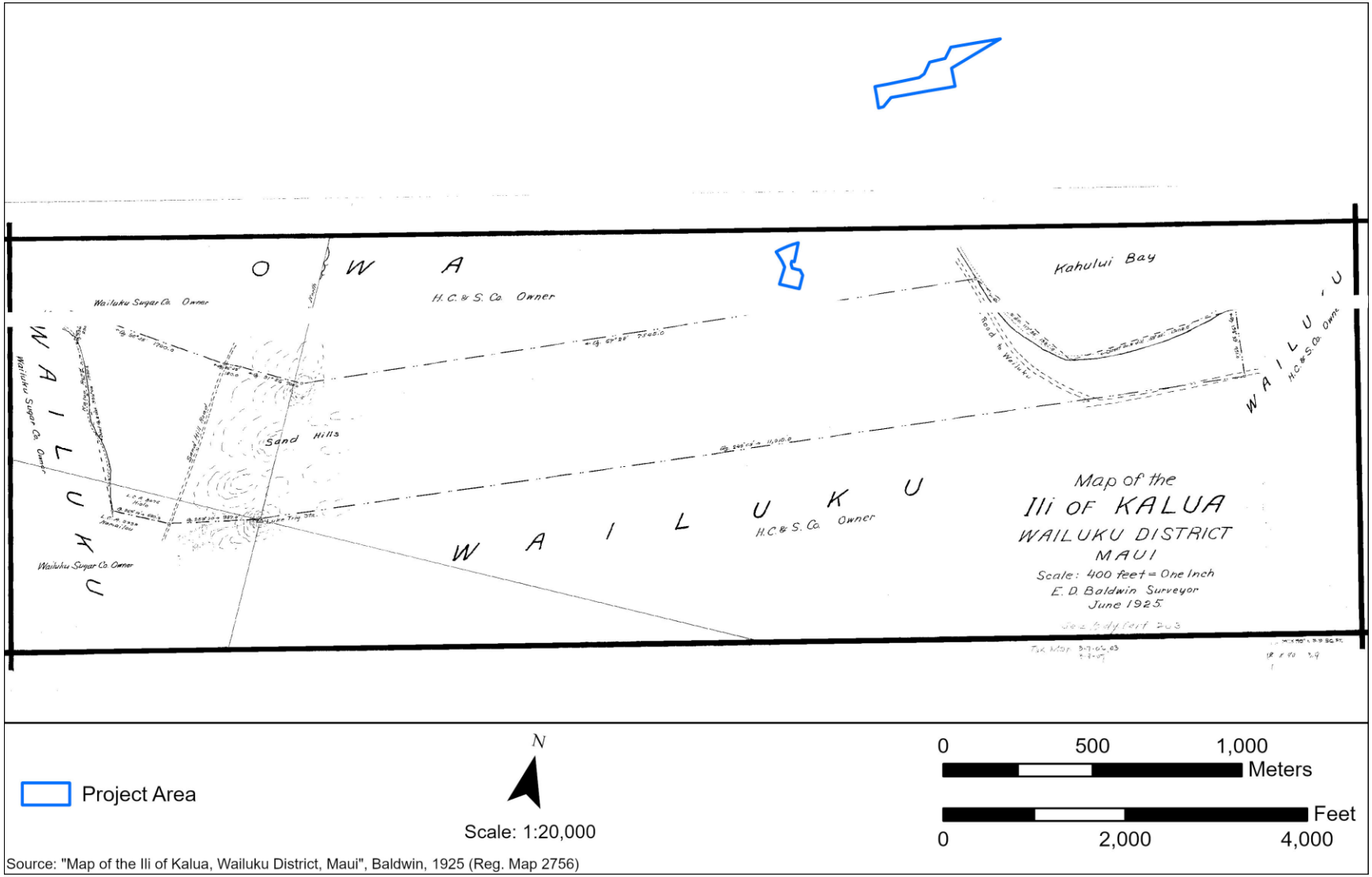
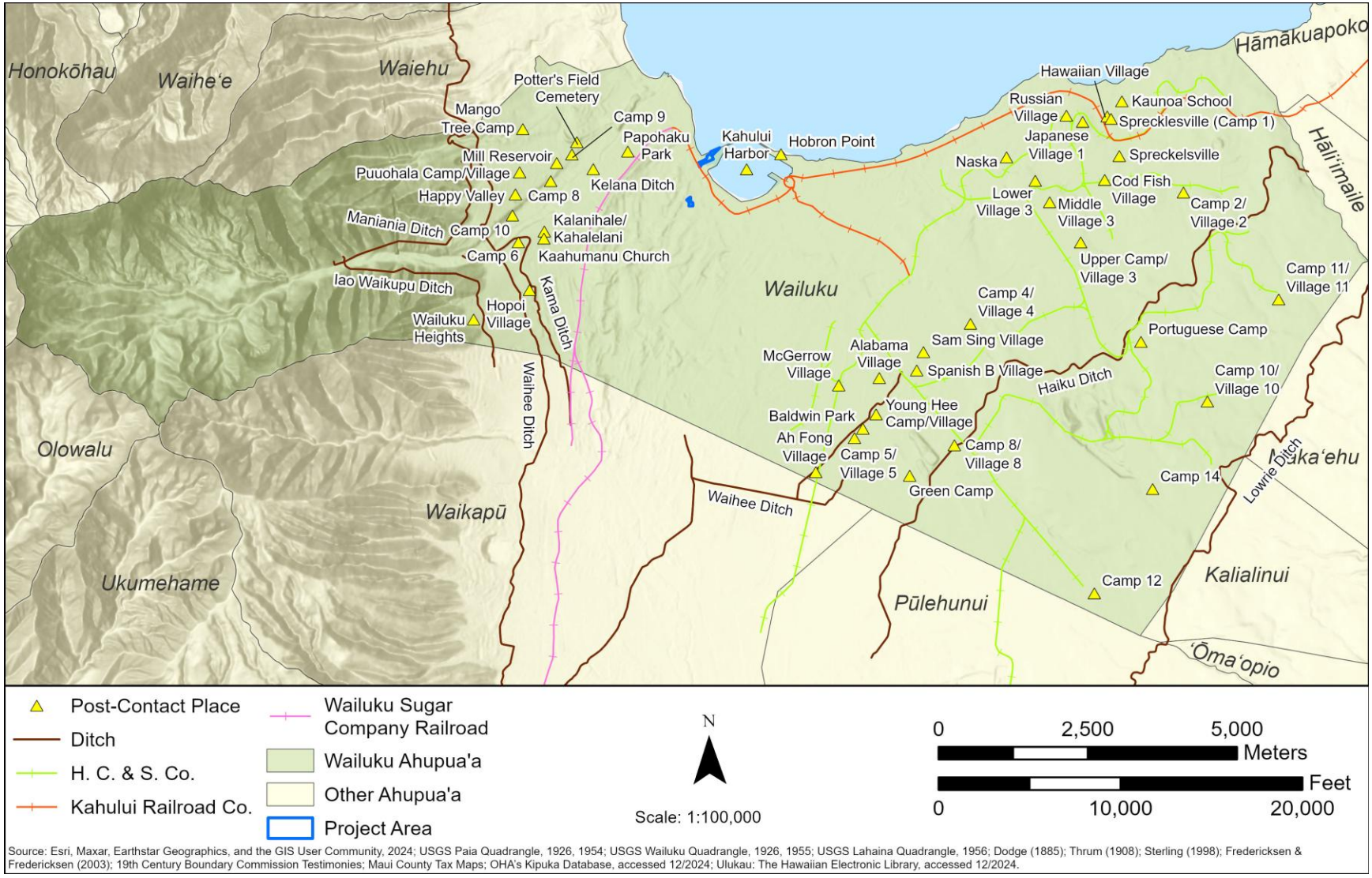


Figure 80. An 1893 map of the Spreckelsville Plantation. The "road across sand hills" runs through the northernmost portion of the Maui portions of the HIFL project area.



Source: "Map of the Ili of Kalua, Wailuku District, Maui", Baldwin, 1925 (Reg. Map 2756)

Figure 81. A 1925 map of the *ʻili* of Kalua. The *mauka* portion of the Maui HIFL project area at UH Maui College was part of lands formerly owned by HC&S.



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, 2024; USGS Paia Quadrangle, 1926, 1954; USGS Wailuku Quadrangle, 1926, 1955; USGS Lahaina Quadrangle, 1956; Dodge (1885); Thrum (1908); Sterling (1998); Fredericksen & Fredericksen (2003); 19th Century Boundary Commission Testimonies; Maui County Tax Maps; OHA's Kipuka Database, accessed 12/2024; Ulukau: The Hawaiian Electronic Library, accessed 12/2024.

Figure 82. A selection of post-Contact features identified in Wailuku Ahupuaʻa, the majority of which are in some way related to the post-Contact sugarcane industry.

3.3.8 Transportation

For much of the nineteenth and early twentieth centuries, the sugarcane business and its major players drove development in Wailuku Ahupuaʻa. This included improvements to sea and overland routes to facilitate the transport of sugar from the cane fields to the mills, and from the mills to the harbor for export.

The Kahului Railroad

The sugar industry provided the main driving force for the development of railroads throughout Hawaiʻi, and the Kahului Railroad became the first public railway in Hawaiʻi. The railroad was organized as a partnership by Tomas H. Hobron, William O. Smith, and William H. Bailey, and officially called the Kahului & Wailuku Railroad. Hobron established a general merchandising business on Bay Street, which eventually became the headquarters for the railroad. Smith and Bailey were Hobron's sons-in-law, and the latter eventually became the manager of the Wailuku Sugar Company. Historical records for the railroad's construction are sparse and occasionally conflicting, though it appears that the rail was first established in 1879 as a three-mile stretch connecting the sugar mill at Wailuku with the port at Kahului. The railroad was a narrow-gauge type, with a track gauge of 36 inches (Ramsay 1960).

The song *Kaʻa Ahi Kahului*, written by Palani Vaughan, celebrates the inauguration of the first passenger train service on Kahului Railroad in 1879:

Eia ka moʻolelo pōkole	Here is the short story
No ke kaʻa ahi mua o Hawaiʻi Nei	About the first train in Hawaiʻi
Chūkū-chūkū maila, chūkū-chūkū maila	Choo-choo, choo-choo
Koʻehu (kuehu) aku ma ke alahao	Stirring dust along the tracks
Hūlō, Hūlō, no Ka Lani e	Hurrah! Hurrah! For the chief
No Ka Lani ʻO Kalākaua	For the chief, Kalākaua
Ke mea i kākau kona inoa	The one who signed his name
Ma ka Palapala no ka chūkū-chūkū	On the Act for the Railroad
Lohe mai e nā keiki hānau o ka ʻāina	Listen, oh children of the land
Lohe mai i ka moʻolelo chūkū	Listen to the train story
A i ko ʻoukou Ka Lani hope	And (hear) about your last King
Ka mea i kākau kona inoa	The one who signed his name
[Hui:]	[Chorus:]
Wū-wū Kaʻa Ahi Kahului	Woo-Woo! Kahului Railroad
Ke alahao a i Wailuku	Tracks all the way to Wailuku
Wū-wū Kaʻa Ahi Kahului	Woo-woo! Kahului Railroad
Chūkū-chūkū mua o Hawaiʻi	The first train of Hawaiʻi

(Vaughan 1997, recorded and translated by Huapala Hawaiian Music and Hula Archives)

In 1880, the railroad began expanding, with tracks heading east to Hamakuapolo, Spreckelsville, and Pāʻia. In 1881, it incorporated under the name of the Kahului Railroad Company. In 1884, the railroad was sold to Samuel G. Wilder, of the Wilder Steamship Company. In 1899, the rail was sold again to HC&S, which by that time had come under the ownership of Alexander and Baldwin. The

rail continued expanding into the early twentieth century to connect additional plantation facilities. On February 8, 1913, the main line was extended to terminate at the cannery at Haiku, completing the main line route. By the middle of the 1920s, the main railroad terminal at Kahului was an expansive 219 acres, equipped with a freight yard, freight station, coach shed, machine shop, blacksmith shop, car repair shop, welding shop, boilermaker shop, roundhouse, transit sheds, and harbor front lots. In 1923, a new general office building was built out of concrete, and in 1926 the older wooden buildings were also replaced with reinforced concrete structures (Ramsay 1960). Figure 83 depicts the myriad narrow-gauge rail tracks radiating out from Kahului Harbor to transport agricultural products from the fields to the mills and canneries, and on to harbor for shipping.

During the war, the Kahului Railroad also became the main service line to transport war materials and general merchandise, and remained one of the few lines to continue operations following the war. The railroad was only slightly impacted by the 1946 tidal wave, though the general office building could not say the same. Waters flooded the basement, destroying many of the old railroad records (Ramsay 1960).

In 1964, the Libby, McNeill & Libby cannery was sold after several months of closure. When it reopened under new ownership as the Haserot Pineapple Co., its production was halved and the new owners decided to use trucks to transport their product, rather than the rail. This kicked off a trend of companies switching from railway to truck transport, also facilitated by improvements to Maui's roadways. The railroad had also begun showing its considerable years, and the cost of maintaining the tracks and related infrastructure had increased. In 1965, the Interstate Commerce Commission approved an application to abandon the railroad. The abandonment ceremony for Kahului Railroad took place on May 24, 1966, with the last ever run carrying retired employees and their guests on a short trip through the railway yard (Ramsay 1969).

In 1967, Midwest Steel Corporation purchased the railroad's physical plant and began scrapping. The rails were dismantled using a scrap train with a hook device that pulled up the rails, and the trestles were blown up with dynamite. The steam car 0-4-2T, which began operations in 1882, was donated to the Bernice Pauahi Bishop Museum in 1967. The Lahaina, Kaanapali, and Pacific Railroad (the Sugar Cane Train) was built in 1969, using repurposed rails and other track materials from the Kahului Railroad (Ramsay 1969).

Prior to being dismantled, the Kahului Railroad passed near the *mauka* (southern) boundary of the portion of the HIFL project area at Kahului Harbor.

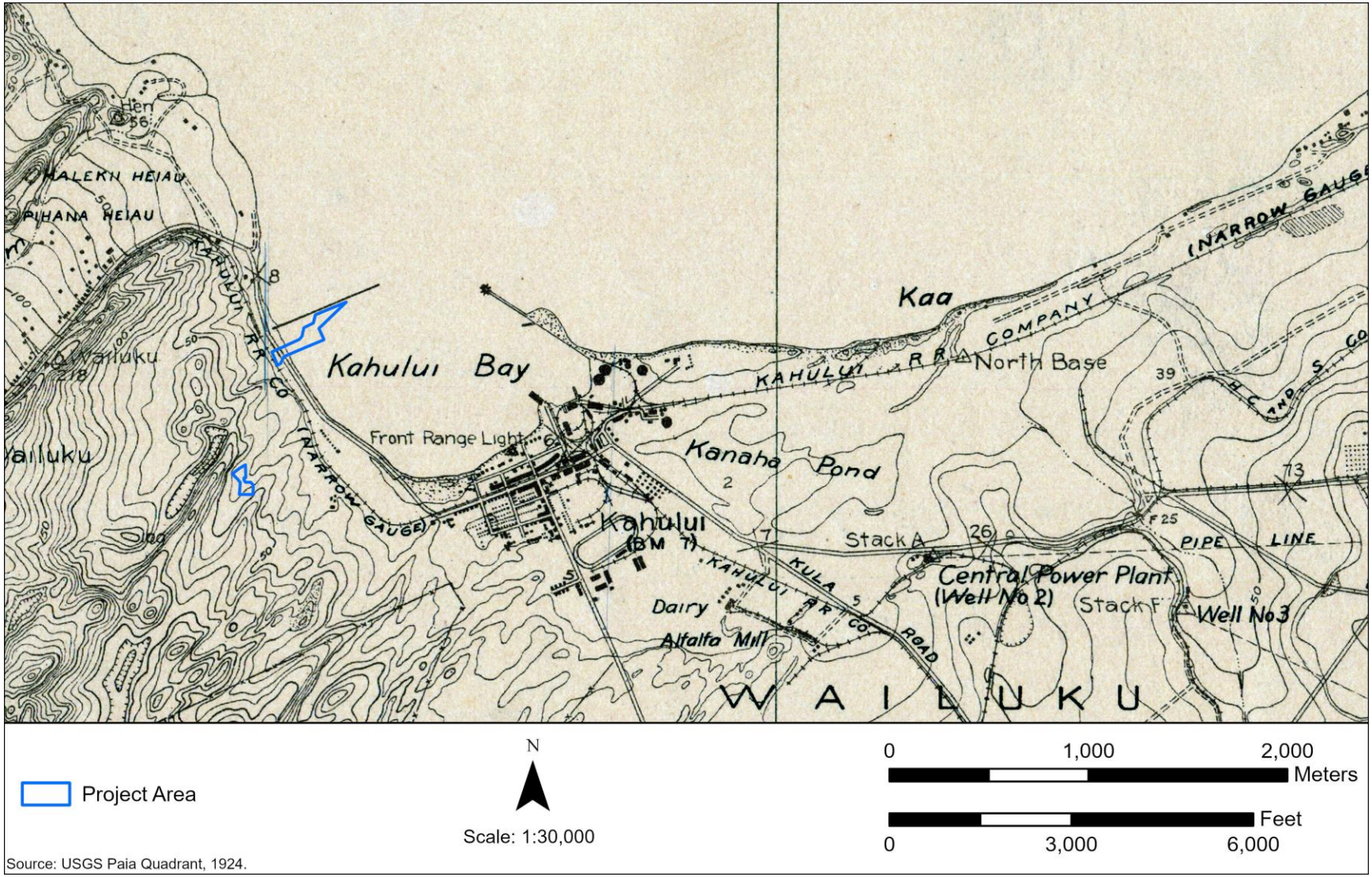


Figure 83. A 1924 USGS map, which features the "Kahului RR Co. Narrow Gauge" tracks connecting the agricultural fields throughout Wailuku with mills, canneries, and shipping facilities.

Kahului Harbor

The development of Kahului Harbor was intimately tied to the sugar industry, as well as the Kahului Railroad. When Alexander and Baldwin purchased Kahului Railroad, they envisioned an interconnected service that would provide transportation not just to the mills and canneries, but shipside for export. This required the construction and maintenance of harbor facilities, including a deep-water port for the large ships entering the harbor, and associated transfer and storage facilities at the harbor terminal. This interconnected transportation scheme placed the onus for harbor development on the railroad company (Ramsay 1960).

An 1881 survey map shows the onshore portion of the project area cutting across the Railway and the Old Beach Road to Wailuku, while the offshore portion lies on an offshore coral flat near a part of the coastline that "Breaks nearly at all times" (Figure 84). In 1900, at a cost of $335,000, the railroad constructed an 1,800-foot breakwater, dredged an 11.5-acre basin, installed mooring buoys, and built a wharf at Kahului Bay. In 1910, the breakwater was transferred to the Federal Government, and from this point forward, the Federal Government became responsible for maintenance of the harbor, while the Territory maintained responsibility over the wharf terminals. The same year, Congress authorized an extension of the breakwater to 2,000 feet, as well as additional dredging in the harbor basin. In 1917, construction of the West breakwater was authorized by Congress. These improvements were completed by the railroad by 1932 (Ramsay 1960).

Numerous improvements to the Wharf were made by the Territory through the early 1900s. This included the construction of Pier 1 in 1923, and Pier 2 in 1928, as well as a number of warehouses to handle bagged sugar. In 1942, the railroad made history by building the world's first bulk sugar storage, receiving, and shipping plant at Pier 1, along with specialized "hopper-bottom cars" that were designed to deposit bagged sugar cargo from the train car directly onto the conveyor belt (Ramsay 1960:31). A 1941 map of Kahului Harbor shows the project area running along Kahului Beach Road on the west side of the harbor near the breakwater, with Piers 1 and 2 to the east (Figure 85, Figure 86).

3.3.9 Kahului Town

The tidal wave of 1946 that destroyed many of the Kahului Railroad Company's records swept away much of the early recorded history of Kahului town. The *Maui News* published a brief history of Kahului in the wake of the plague arriving there at the turn of the century. It reported that the first house built in Kahului was a warehouse built by Thomas Hogan in 1863. In 1873, a store known as Kimble's was built near the warehouse, and a wheelwright and blacksmith shop were added in 1876. According to this article, at the time, "Kepoikai, the father of Senator A. N. Kepoikai of Wailuku, owned and conducted the fishing right at Kahului, his residence being further up the beach toward Wailuku" (Maui News 1900a:2). A tidal wave had also hit Kahului that year, though the article did not report any significant damages. It further noted a custom house was built in 1881, and that the Kahului railroad was begun in 1882 (*Maui News* 1900; *n.b.*, construction of the railroad appears to have begun several years earlier, though it was not incorporated under the name "Kahului Railroad" until 1881; Ramsay 1960).

In early 1900, an outbreak of the bubonic plague struck Kahului. A meeting of the Sanitary Committee of Maui was held at the offices of the Kahului Railroad in February 1900, where a

number of difficult decisions were made to contain the disease. The committee located the source of the infection to "the district in Kahului, known as Chinatown, bounded by the Kahului railroad track and the new wharf, and Front street to the seaside, excepting the Custom house," and agreed to burn down this section of the town (Figure 87). A quarantine was instated on the entire town, and officers were sent out to track out anyone who had left the infected parts of Kahului in the last week and return them. It was also designated that the Kahului Railroad handle all freight, and employ only men who came from the uninfected districts outside of Kahului (*Pacific Commercial Advertiser* 1900).

The Chinatown section of Kahului was dynamited and burned at the recommendation of the committee. Some, including a proposal advanced by the *Maui News*, advocated for burning the entire town down and starting over in a new site further back from the harbor, where there would be "a new Kahului more beautiful, more commodious and more healthful than the present site has ever been, and then we would have a Kahului absolutely free from all taint of plague" (Maui News 1900b). The Board of Health instead ordered that Kahului be enclosed in a corrugated iron rat-proof fence:

> This fence will take in the lumber yard, the H.C. & S. Co store and warehouses and the Kirkland, Church and Filler residences on the east side of town; thence parallel with the road from Kahului to Wailuku, and in fact taking in part of this road. The western line of fence will run from a point near the detention camp to the beach, leaving the cottage where Mr. Ball lives just outside the fence. This practically shuts in the whole of Kahului. The construction of the fence has begun, and will probably be finished by Monday night. As soon as the fence is completed, a vigorous and systematic warfare will be inaugurated against the rats in the enclosed district. (Maui News 1900c:3)

Following the quarantine, Camp Wood, the station used to quarantine those who lived in Chinatown during the outbreak, was purchased by HC&S, who used the camp to house laborers from the Kahului Railroad Company (Maui News 1900d).

On June 13, 1907, the leaseholders of Kahului properties met together and were asked by the owner of the land, the Kahului Railroad Company, to surrender their leases so that large-scale improvements could be made to the town, and new lots laid out. The *Maui News* reported that "Steps have been taken to raise the lower levels, improve the sewerage and water systems and provide for fire protection and the new town will be laid out in the most modern lines" (Maui News 1907:1). The Kahului Railroad Company retained ownership of the lands around Kahului and adjacent to the harbor through the early twentieth century, and continued to develop the town and its surroundings. A 1942 map highlights the development of the town around a nucleus of commercial sugarcane infrastructure, with development concentrated around the harbor facilities on the east side of the bay, and the Kahului Railroad crossing through the project area to connect sugar plantations with shipping facilities (Figure 88).

The town of Kahului continued to expand and develop in the late 1940s, and cars, trucks, and buses replaced the rail line as the prevailing means of transportation. The H.P. Baldwin High School and Maui Memorial Hospital were built in Wailuku, and a master plan was developed for Kahului that would provide fee-simple ownership of single-family homes. The 1950s saw further development, with the construction of a shopping center and the opening of the first two hotels in Kahului, the Maui Palms and Maui Hukilau (Krause et al. 2020). By the end of that decade, Hawai'i had become the 50th state to enter the Union.

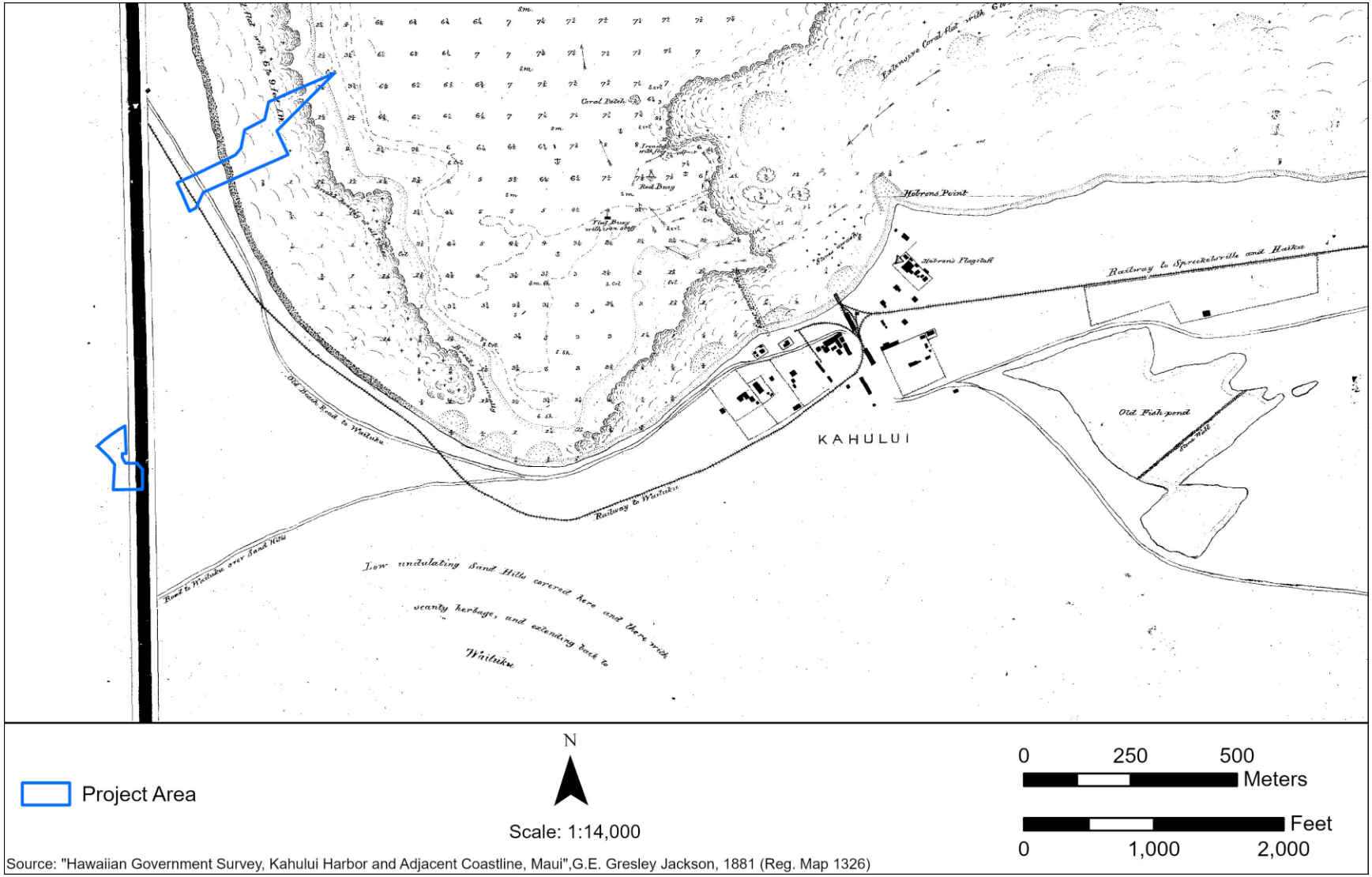


Figure 84. An 1881 map of Kahului Harbor. The "Old Road to Wailuku" and the "Railway to Wailuku" cross into the Maui portions of the HIFL project area. Note also the portion of the shoreline that "Breaks heavily at all times."



Figure 85. A circa 1932-1942 photograph of Kahului Harbor showing the West and East breakwaters, wharf, and Kahului town (U.S. National Archives and Records Administration).



Source: "Kahului Harbor and Approaches, Kahului, Maui," T.J.K. Evans, 1941 (Registered Map 3056WIDE).

Figure 86. A 1941 map of Kahului Harbor. Kahului Beach Road crosses into the Maui portions of the HIFL project area. The west breakwater is also adjacent to the project area.

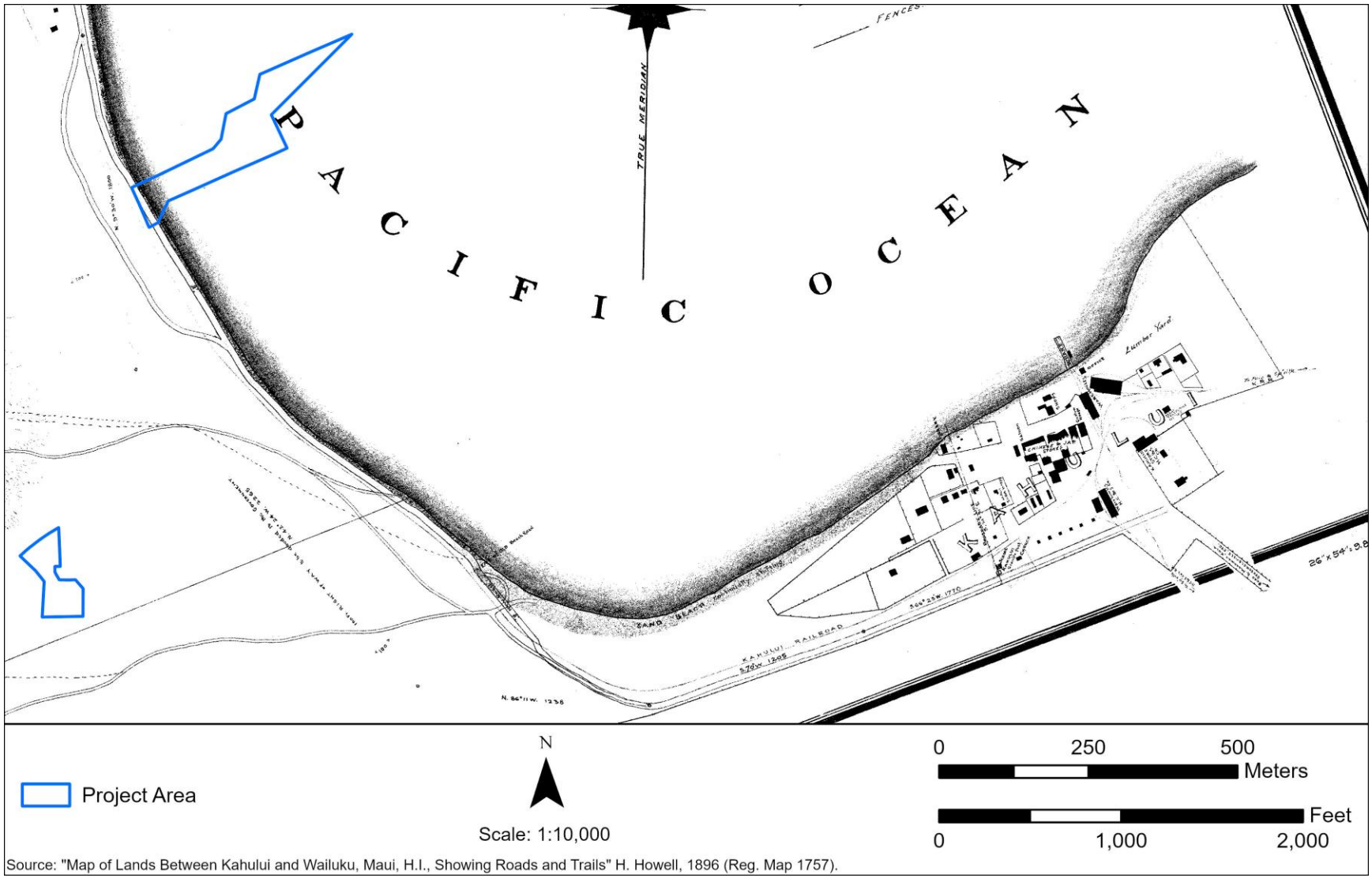
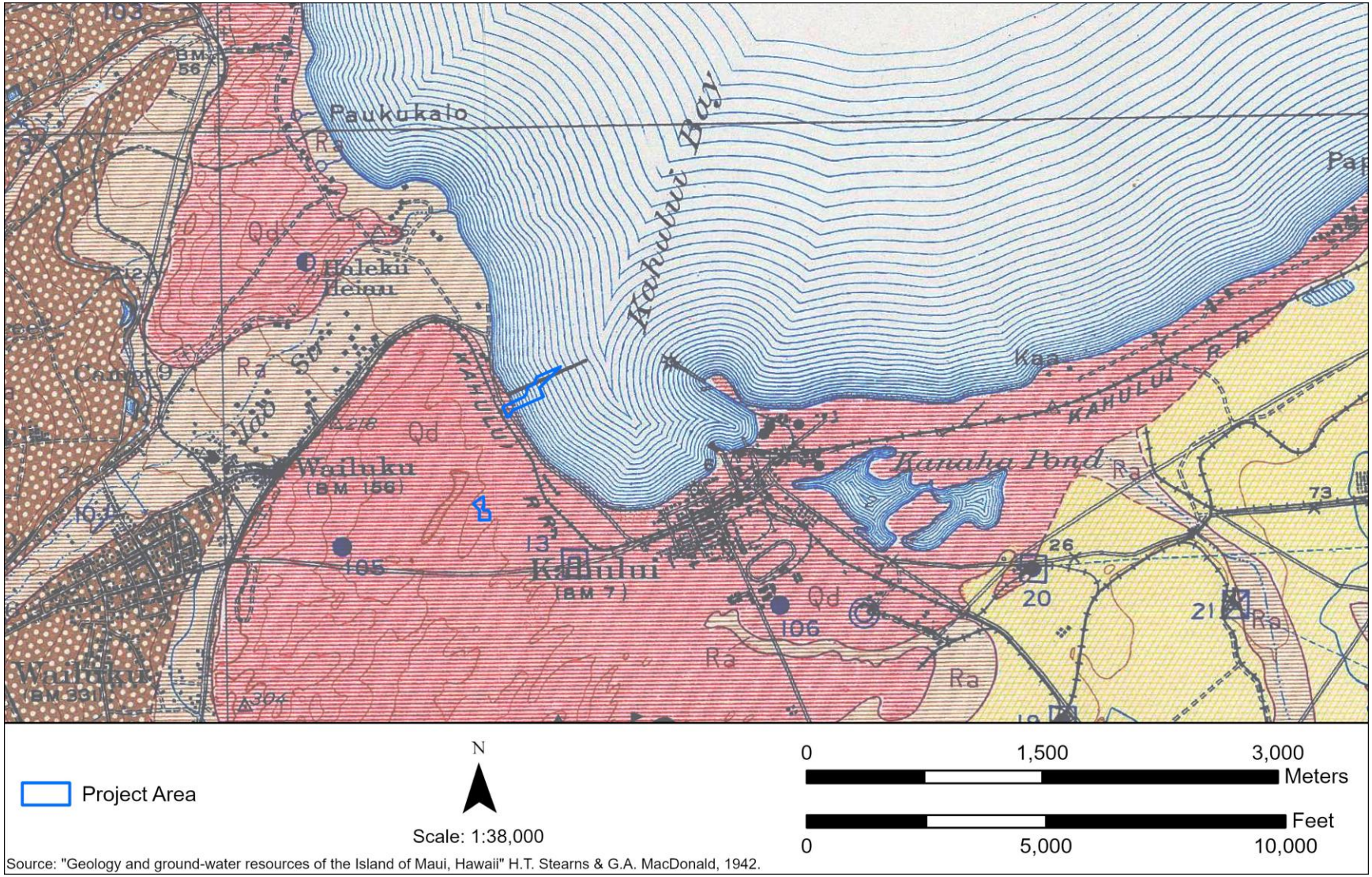


Figure 87. An 1896 map showing the early development of Kahului Town, including a lumber yard, office, warehouses, shops, and a custom house near the wharf. Much of this central area was burned when the plague hit Kahului in 1900.


Paukukalo
Kahului Bay
Waiehu
Waiehu Sta.
Waiehu Beach Rd
Waiehu Kai Dr
Waiehu Kai Beach
Waiehu Golf Course
Waiehu Golf Course
Waiehu Golf Course

3.3.10 World War II

On the evening of December 15, 1941, at least 10 high-explosive shells were fired at Kahului from what was believed to be an enemy submarine. Four of the shells landed on the property of Maui Pineapple Company, while others landed at the Kahului Vocational School, in front of William H. Walsh's beach home, splashing in the harbor at the breakwater. One of the shells bounced off the iron tracks of the Kahului Railroad and hurtled into American Can Company property. Some small property damage was recorded, but no one was injured (*Honolulu Advertiser* 1941).

During the war, Kahului Harbor and the surrounding area became an important location for naval operations and military supply routes. In 1942, 20 buildings were constructed or refurbished at Kahului Harbor's Pier 2 to serve as a base of operations for shipping military supplies. Near the end of 1942, construction began on Naval Air Station Kahului. In 1943, 40 corrugated steel Quonset huts with poured concrete foundations were built along the west side of Kahului Harbor, fronted by the Kahului Railroad (Fredericksen and Fredericksen 1992c). Figure 89 shows the project area bordering the Quonset huts to the south and east. In addition, 19 concrete ammunition storage magazines were built in Kanahā Pond, which have today been adapted to storage bunkers for the State and County (Krause et al. 2020). In 1944, The 18th Service Battalion, whose role was to supply the Fourth Marine Division at Camp Maui and facilitate the disposal of military supplies and equipment at the end of the war, built a camp near what is now the UH Maui College campus (Fredericksen and Fredericksen 1992c). Krause et al. (2020) described NAS Kahului and NAS Puunene as virtual cities themselves, housing thousands of military personnel and employing hundreds of civilians.

In 1945 following Japan's surrender to the U.S., some facilities, including a bowling alley and bakery, were relocated from NAS Puunene to NAS Kahului (Krause et al. 2020). However, in 1946, a series of tidal waves, some over 11 feet high, hit Kahului Bay, causing significant damage to the harbor and NAS Kahului. According to Krause et al. (2020:41), "Kahului Harbor was left empty when the water receded." In 1947, NAS Kahului was transferred to the Civilian Aviation Authority for the Territory of Hawai'i, and most of the equipment there was dismantled and shipped to other military installations in the Pacific (Krause et al. 2020).

Areas that had been used for wartime activities mostly returned to their previous ranching and agricultural uses following the war. In 1948, ownership of the marine camp of the 18th Service and Supply was turned over to the Kahului Railroad Company. The Quonset huts, which had served as storage and office space for the camp, were then used by the Kahului Railroad Company until 1965, when rail service stopped. After the railroad was decommissioned, various commercial businesses used the Quonset huts, until they were destroyed and removed in the 1980s. Fredericksen and Fredericksen (1992c:5) identified the remains of the camp, which included "Remains of various poured, reinforced concrete floors and foundations of buildings and structures which were part of the 18th Service Battalion military camp complex." These remains were later designated SIHP 50-50-04-04232. Charles Keau described the dismantling of the Quonset huts:

> I don't know when did they started [demolishing the Quonset huts]. Because as the buildings were getting old, A&B wouldn't restore them. It wasn't worth the price. So one by one of the buildings were falling down. They didn't issue a new lease, so gradually people moved out.
>
> The reason I was involved in this clean-up project: in '90, '90, someplace around there, Parks and Recreation asked me to come down. They were cleaning out all the Quonset huts and all

> the junk automobiles and cars. They were digging deep holes [to bury the debris]. (Keau as cited in Heidel et al. 1997:34)

Keau further noted that the buried debris in areas *mauka* of SIHP -04232 likely contained ammunition and toxic materials. Some of the remaining concrete foundations were removed during the construction of the Maui Arts & Cultural Center, and the rest were covered by recent fill or incorporated into the design of Maui Central Park (Heidel et al. 1997).

3.3.11 UH Maui College

In 1929, the Territorial Legislature authorized $20,000 for the construction of Maui Vocational School, which was built two years later near the Kahului Elementary School, in a portion of what is now the UHMC campus (Figure 90). The school started as a single-story building that held an automobile shop, carpentry shop, machine shop, electrical shop, classroom, and offices. In 1941, the machine shop instructor, Duncan Sinclair, became the principal of the school. During his 25-year tenure, the school grew significantly. A dressmaking program was added, and existing programs were expanded to the point that the school no longer fit within its single building. HC&S donated 11.5 acres of land on Kaahumanu Avenue to expand the school, and auto, carpentry, and machine shops were added to the campus, as well as additional administrative and classroom buildings. By 1955, this expanded to include an auto body shop and an architecture and drafting program (Fredericksen and Fredericksen 1992c).

In 1958, the Maui Vocational School was renamed to Maui Technical School. In 1965, the Community College system was created by the University of Hawai‘i, and the school became Maui Community College and was authorized to confer Associate in Arts and Associate in Science degrees. The entry into this system necessitated the creation of general education programs, and an “upper campus” was developed for the purpose, leaving the “lower campus” primarily oriented towards the existing vocational programs (Fredericksen and Fredericksen 1992c) (Figure 91). In 2010, the UH Board of Regents agreed to change the name of Maui Community College to UH Maui College, to more accurately reflect the school’s offering of four-year bachelor’s degrees *(Honolulu Star-Bulletin* 2010).

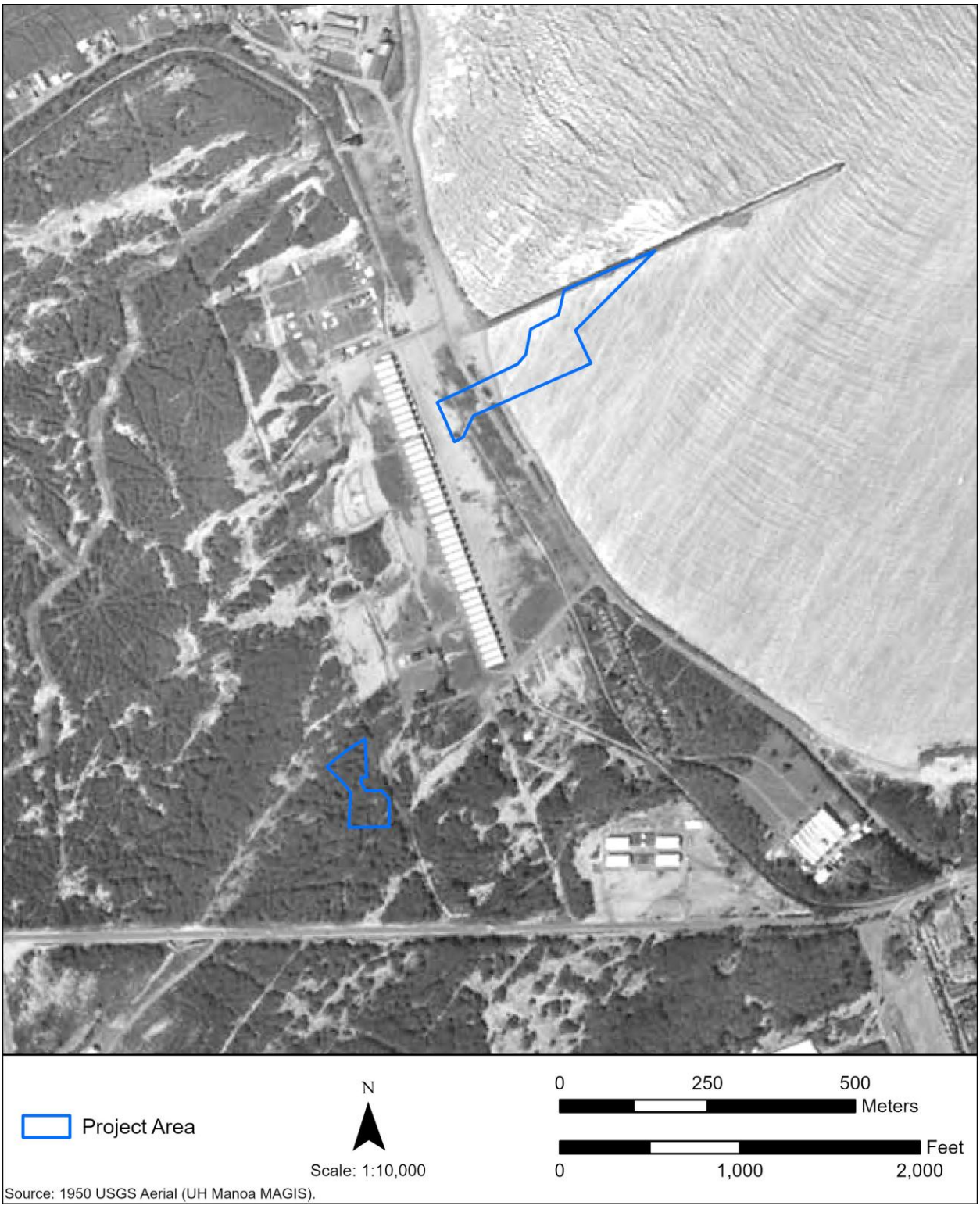


Figure 89. Aerial imagery from 1950 showing the Quonset huts that served as office and storage space for the 18th Service Battalion during WWII in relation to the Maui portions of the HIFL project area.

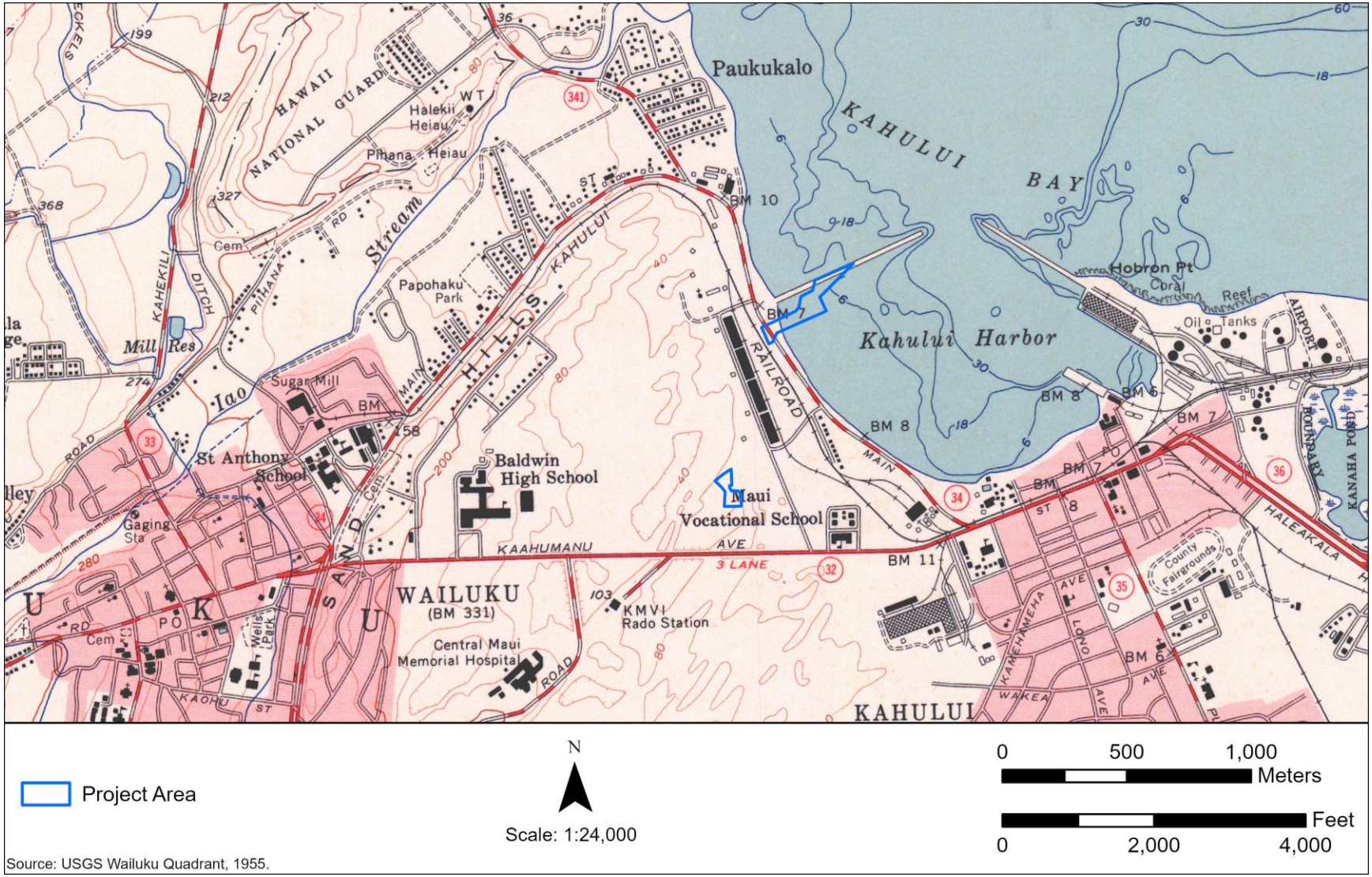


Figure 90. A 1955 USGS map depicts the "Maui Vocational School" to the southwest of the Maui portions of the HIFL project area.



Figure 91. Aerial imagery from 1965 showing the developed "lower campus" of Maui Community College in the vicinity of the Maui portions of the HIFL project area.

3.3.12 Previous Consultation for Nearby Projects in Wailuku Ahupuaʻa

The knowledge shared in previous CIAs for Wailuku Ahupuaʻa, specifically around Kahului Harbor and UH Maui College, can provide further understanding of the cultural practices and the exercising of Native Hawaiian rights in this area. Welch et al. (2004) and Tanaka and Hammatt (2020) conducted CIAs for projects in Kahului Harbor and McElroy et al. (2024) conducted a CIA for the Kahului Civic Center, near the portion of the HIFL project area at UH Maui College.

Welch et al. (2004) and Tanaka and Hammatt (2020) emphasized the traditional and enduring subsistence, habitation, and recreational activities occurring in and around Kahului Harbor. CIA participants described traditional fishing in the area, including fishing in Kanahā Pond, shellfish gathering, picking of *limu*, turtle hunting, *hukilau* along the Kahului shore, and gathering of salt from salt pans (Welch et al. 2004:26). *Kalo* grew alongside the fishponds and areas with freshwater streams, and CIA participants shared that fishing and *kalo* cultivation went hand-in-hand in this area (Welch et al. 2004:28). The sandy shores were suitable for canoe landings along the shores of Kahului, and this area was a focal point for settlement, from the time of traditional Hawaiian villages along the shore and Kanahā Pond through to plantation-era employee and laborer camps, notably the "Raw Fish Camp" (Welch et al. 2004; Tanaka and Hammatt 2020:162). Due to this settlement history, as well as the prevalence of sandy soil and sand dunes, and previous discoveries of burials in the area, participants stressed the potential for burials and cultural deposits. They emphasized the importance of treating them with respect and advocated for cultural monitors to be on site during project construction activities (Welch et al. 2004; Tanaka and Hammatt 2020; McElroy et al. 2024).

Although recent development along the Kahului shoreline has changed the shape of the shoreline and limited access to many of the resources found there, CIA participants noted that people continue to fish in the harbor for subsistence and enjoy cultural activities alongside the harbor's commercial use (Welch et al. 2004:27). People use pole or throw net fishing and gather *halalū* and *akule* (young and adult bigeye scad; *Trachurops crumenophthalma*), *uouoa* (sharp-nose mullet; *Neomyxus leuciscus*), *limu* (seaweed, i.e., *manauea*; *Gracilaria coronopifolia*), *moi* (threadfish), *ʻoʻopu* (goby), *ānaholehole* (Hawaiian flagtail), *pāpio* (the young of the *ulua* or jackfish), *enenue* (chub or rudderfish), *manini* (surgeonfish), and lobster. Small boat fishermen use the public boat ramp at the end of the harbor to launch their boats (Tanaka and Hammatt 2020). Two canoe clubs use the bay for training and canoe races. Both clubs have canoe houses on the grounds to store their canoes (Welch et al. 2004). Surfers and swimmers continue to use the harbor and surrounding area for recreational activities.

Participants in previous CIAs expressed concern for the health of the ocean resources and mature trees with any development in the area. Participants emphasized that people still depend on the marine resources and stressed that any activities in the area need to minimize harm to this critical resource (Welch et al. 2004; Tanaka and Hammatt 2020). One participant noted the sensitivity of octopus and squid as their young wash up dead in the harbor in large quantities during the birthing season (Tanaka and Hammatt 2020). Inland, participants expressed concern over the unnecessary destruction of mature trees during construction and advocated for new developments planting culturally significant and useful plants in landscaping, such as *palapalai* (*Microlepia strigosa var. strigosa*), noni (*Morinda citrifolia*), and *lauaʻe* (*Microsorum spectrum*) (McElroy et al. 2024:29).

3.3.13 Previous Archaeology

A total of 34 archaeological studies have been conducted within a 0.5-mile (0.8-km) buffer around the Maui portions of the HIFL project area, depicted in Figure 92. Table 11 provides an overview of all 34 archaeological investigations with a summary of their findings. A total of 32 historic properties have been identified within this 0.5-mile buffer. All previously identified historic properties are depicted in Figure 93 and described in Table 12, which also contains significance assessments and mitigation recommendations.

Nearby historic properties reflect both pre- and post-Contact activities in Kahului. The Maui portions of the project area are situated largely on Puuone sands, and a number of burials in the vicinity reflect the traditional use of coastal sand dunes as a burial area. Other pre-Contact historic properties in the area include subsurface cultural deposits and habitation complexes. All burials and historic properties associated with the pre-Contact period are located to the north and west of the Maui portions of the HIFL project area. The location of Malaihakoa Heiau (SIHP 50-50-04-00055; Walker 1931 Site 55) near UH Maui College in Figure 93 is on file with SHPD and was obtained through HICRIS. However, Walker (1931; see Sterling 1998:64) reported this *heiau* as having been destroyed, and located at Paukukualo, which is on the coast to the northeast of the project area.

Post-Contact historic properties include features associated with commercial sugarcane agriculture and related infrastructure, the development of Kahului Town, and the impacts of WWII. This includes portions of the Kahului Railroad Berm, commercial and residential structures, recreational and educational facilities, and WWII infrastructure. A portion of the project area lies within the Kahului Harbor Historic District (SIHP 50-50-04-02953), which was added to the State Register of Historic Places in 1974 during the statewide inventory. According to the nomination, "Kahului Harbor consists of the piers, wharves, breakwaters, and associated structures that make up the active harbor facility. It is significant for its role in the development of the town of Kahului from 1901 to 1931" (on file, SHPD). SIHP 50-50-04-04232, a series of WWII-era Quonset huts associated with the 18th Service Battalion Camp, was identified northeast of the portion of the project area at UH Maui College and directly southwest (inland) of the project area at Kahului Harbor. Following the war, the Quonset huts were repurposed into commercial office and storage space until they were dismantled in the 1980s. The remaining concrete pads were destroyed, reburied, or incorporated into the design of Maui Central Park (Heidel et al. 1997).

During Pacific Legacy's field inspection, carried out as part of the LRFI for the HIFL Project, no potential historic properties were identified within the Maui portions of the HIFL project area.

Table 11. Previous Archaeological Studies within 0.5 miles of the Maui Portions of the HIFL Project Area

Reference	Type of Study	Findings
Walker 1931	Island-wide Survey	Identified Site 55, Malaihakoa Heiau (later designated as 50-50-04-00055), possibly within 0.5 miles of the current project area.
Kennedy 1988a	Archaeological Reconnaissance	No historic properties identified.
Kennedy 1990	Archaeological Testing	No historic properties identified.
Fredericksen and Fredericksen 1992a	Archaeological Inventory Survey	Identified two historic properties, both of which are located within 0.5 miles of the current project area: SIHP 50-50-04-03112, the Kahului Railroad complex, and 50-50-04-03135, remnants of the Makaweli Rock Crusher Mill. SIHP -03112 was assessed as significant under Criterion d. No significance assessment was made for SIHP -03135. Developers stated that portions of SIHP -03135 (concrete pillars) were going to be preserved, but the concrete chute *mauka* would be removed along with the railroad berm. Archaeological monitoring was recommended for both sites.
Fredericksen and Fredericksen 1992b	Archaeological Inventory Survey	Identified two historic properties: SIHP 50-50-04-03119, refuse area, and SIHP 50-50-04-03120, a subsurface cultural deposit, and documented one previously identified historic property: SIHP -03112, portions of the Kahului Railroad. All three historic properties are located within 0.5 miles of the current project area. Test excavation of SIHP -03120 identified a single human bone. SIHP -03119, SIHP -03120, and the previously identified SIHP -03112 were assessed as significant under Criterion d. The report recommended data recovery and removal for SIHP -03112, additional research and testing of SIHP -03119 and -03120, and archaeological monitoring of all earth moving activities.
Fredericksen and Fredericksen 1992c	Archaeological Inventory Survey	No historic properties identified.
Kennedy et al. 1993	Archaeological Inventory Survey	No historic properties identified.
Fredericksen et al. 1994	Archaeological Inventory Survey	No historic properties identified.
Fredericksen and Fredericksen 1995	Archaeological Inventory Survey	No historic properties identified.
Heidel et al. 1996	Archaeological Reconnaissance with Subsurface Testing	No historic properties identified.
Fredericksen 1997	Archaeological Monitoring	No historic properties identified.

Reference	Type of Study	Findings
Heidel et al. 1997	Archaeological Inventory Survey	Three historic properties were identified, all of which are located within 0.5 miles of the current project area, including one newly identified historic property: SIHP 50-50-04-04211; scattered human remains, and two previously identified historic properties: SIHP 50-50-04-04232, WWII military installation; and SIHP -03112, the Kahului Railroad berm. SIHP -04232 was assessed as significant under Criteria a and d, SIHP -03112 under Criterion a, and SIHP -04211 was determined no longer significant, as the iwi kupuna were relocated by SHPD. Archaeological monitoring was recommended for all construction activities.
Devereux and Hammatt 1998	Archaeological Monitoring	No historic properties identified.
Fredericksen et al. 1998	Data Recovery	Data recovery for three previously identified historic properties: SIHP -03112, -03119 (components A and B), and -03120. No significance assessments or recommendations were made.
Devereux and Hammatt 1999	Archaeological Monitoring	Identified four isolated burials: SIHP 50-50-04-04476 through 50-50-04-04479) and relocated one previously identified burial (50-50-04-04211), which was reinterred.
Rechtman 2000	Archaeological Monitoring	No historic properties identified.
Perzinski et al. 2001	Archaeological Monitoring	No historic properties identified.
Fredericksen and Fredericksen 2002	Archaeological Inventory Survey	Documented two newly identified historic properties during subsurface testing: SIHP 50-50-04-05212, a pre-Contact habitation site and 50-50-04-05213, a concrete foundation originally utilized by Maui Dry Goods & Grocery Co. Ltd. SIHP -05212 and -05213 were assessed as significant under Criterion d and recommended for preservation "as is." Archaeological monitoring was recommended for any ground disturbing activities.
Tome and Dega 2005	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Fredericksen 2005a	Archaeological Inventory Survey	Identified five historic properties: SIHP 50-50-04-05471, 50-50-04-05472, 50-50-04-05495, 50-50-04-05496 and 50-50-04-05660, all of which are located within 0.5 miles of the current project area. These include two possible Native Hawaiian burials (SIHP -05471 and -05472), three in situ burials and the previously disturbed remains of two individuals (SIHP -05495), a pre-Contact habitation area with an associated waterworn basalt pavement (SIHP -05496); and a pre-Contact habitation area remnant (SIHP -05660). SIHP -05660 and -05496 were assessed as significant under Criterion d. Due to its association with SIHP -05495, SIHP -05496 was also assessed as significant under Criterion e, along with SIHP -05471 and -05472. Archaeological monitoring and consultation with SHPD and the Maui/Lānaʻi Island Burial Council was recommended for future ground disturbing activities.
Fredericksen 2005b	Archaeological Monitoring	No historic properties identified.
Cordle and Dega 2007	Archaeological Monitoring	No historic properties identified.

Reference	Type of Study	Findings
Fredericksen 2007	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Kirkendall 2008	Archaeological Assessment	No historic properties identified.
Frey and Fredericksen 2009	Archaeological Monitoring	No historic properties identified.
Perzinski and Dega 2011	Archaeological Monitoring	No historic properties identified.
Hodara and Dega 2015a	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Hodara and Dega 2015b	Archaeological Monitoring	Identified two pre-Contact historic properties, both of which are located within 0.5 miles of the current project area. SIHP 50-50-04-07493 consists of three features: one burial and two cultural layers. SIHP 50-50-04-07494 is a multi-function site with 14 component features, including five burials, eight pit features, and a cultural layer. Both sites were assessed as significant under Criteria d and e. A Burial Treatment Plan was developed and recommended preservation of four of the burials *in situ* and disinterment and reinterment of the other two in their original location. Archaeological monitoring was recommended for any additional ground disturbing activities.
Baggs and Dega 2016	Archaeological Monitoring	No historic properties identified.
Royalty and Hammatt 2017	Archaeological Monitoring	Documented one newly identified historic property and four previously identified historic properties, two of which are within 0.5 miles of the current project area: 50-50-04-01607, Kahului Historic District; 50-50-04-01630, Henry Perrine Baldwin High School.
Fuentes et al. 2022	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
FAI Architects 2023a	Reconnaissance Level Survey	Identified one architectural historic property located within 0.5 miles of the current project area: SIHP 50-50-04-09016, Ichiro "Iron" Maehara Baseball Stadium. SIHP -09016 was assessed as significant under Criteria a and c and recommended for no further survey or architectural mitigation.
FAI Architects 2023b	Reconnaissance Level Survey	Completed architectural documentation of seven buildings, five sites, and one structure in the War Memorial Complex. Two architectural historic properties are located within 0.5 miles of the current project area: SIHP 50-50-04-09017,Coach Soichi Sakamoto Pool, and SIHP 50-50-04-09018,Thomas "Cheena" Lau Hee Little League Field and Toshio "Tata" Fujimoto Baseball Field, and the associated Little League Fields' Restroom. Both properties were assessed as significant under Criterion a, and SIHP -09017 was also assessed as significant under Criterion c. The study recommended no further survey or architectural mitigation at that time. However, HRS Chapter 6E review and consultation with SHPD were suggested for any futures projects in the area.

Note: Previous studies that include the current project area are highlighted in gray.

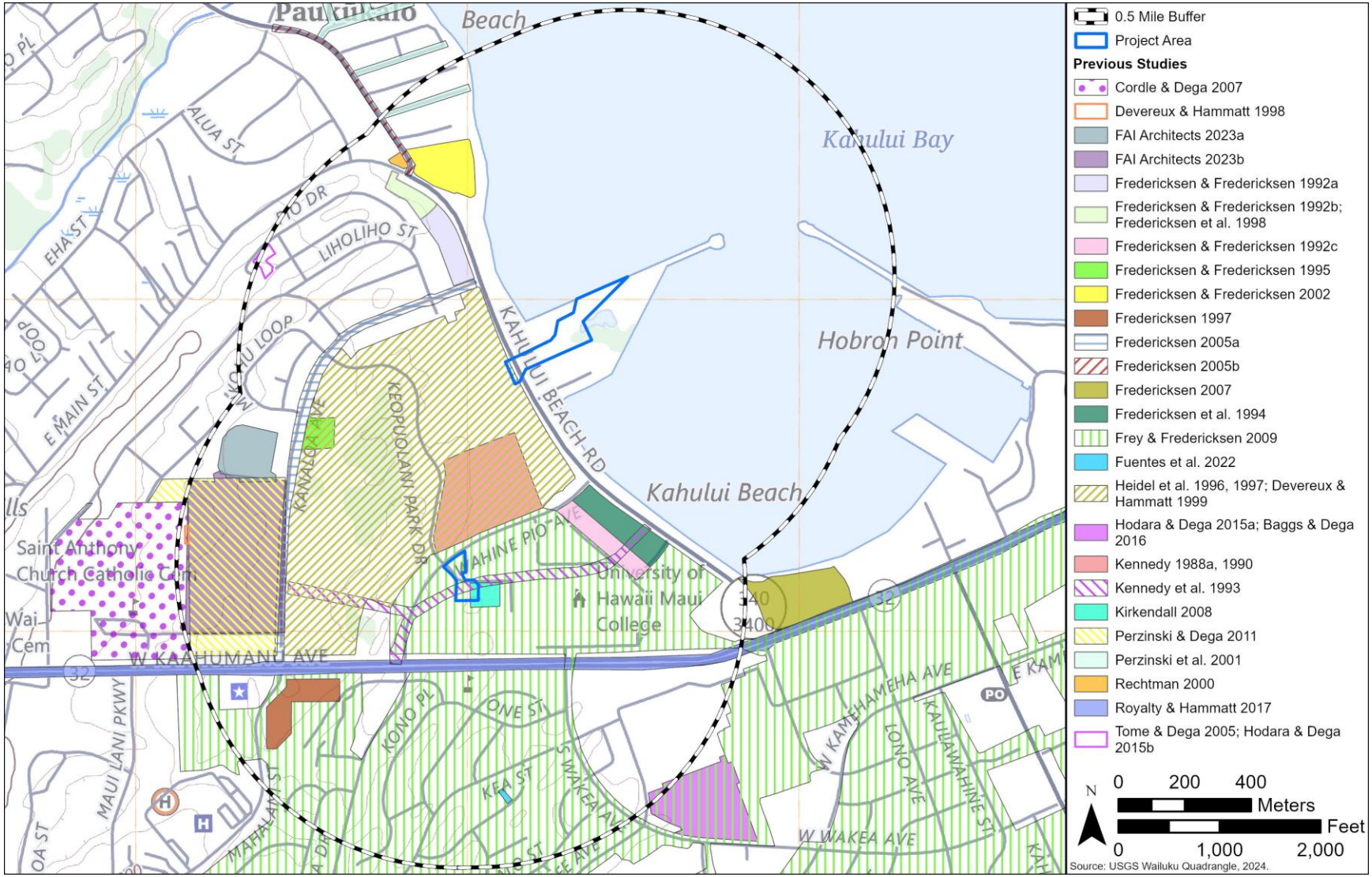


Figure 92. Previous archaeological studies conducted within 0.5 miles of the Maui portions of the HIFL project area.

Table 12. Previous Archaeological Studies within 0.5 miles of the Maui Portions of the HIFL Project Area

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-50-04-00055	Platform-terrace	Malaihakoa Heiau	Pre-Contact	-	-	-	Status: destroyed	Walker 1931; On File, SHPD
50-50-04-01172	Burial, midden deposit	Burial, cultural layer	Unknown	-	-	-	None Provided	On File, SHPD
50-50-04-01630	Henry Perrine Baldwin High School	Education	Post-Contact	-	-	A, C	Preservation	Penkiunas 1992 (NRHP); Royalty and Hammatt 2017
50-50-04-02953	Kahului Harbor Historic District	Transportation; commerce	Post-Contact	-	a	-	None Provided	DLNR 1974
50-50-04-03112	Kahului Railroad Berm	Transportation	Post-Contact	-	a, d	-	Data Recovery and removal (Fredericksen and Fredericksen 1992b); Archaeological Monitoring (Fredericksen and Fredericksen 1992a, Heidel et al. 1997)	
50-50-04-03119	Refuse area	Trash Disposal	Post-Contact	-	d	-	Data Recovery; Archaeological Monitoring (Fredericksen and Fredericksen 1992b)	Fredericksen and Fredericksen 1992b; Fredericksen et al. 1998
50-50-04-03120	Subsurface cultural deposit, burial preserve	Unknown, burial preserve	Pre-Contact	-	d	-	Archaeological Monitoring (Fredericksen and Fredericksen 1992b)	Fredericksen and Fredericksen 1992b; Fredericksen et al. 1998
50-50-04-03135	Makaweli Rock Crusher Mill	Commercial	Post-Contact	-	-	-	None Provided	Fredericksen and

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
								Fredericksen 1992a
50-50-04-04211	Burial and reinterment site	Burial	Pre-Contact	-	e	-	Reinterred	Heidel et al. 1997; Devereux and Hammatt 1999
50-50-04-04232	Quonset huts	US military facility-18th Service Battalion Camp	ca. 1944	-	a, d	-	Partially removed; Concrete pads incorporated into existing park facilities	Heidel et al. 1997
50-50-04-04476	Burial	Burial	Pre-Contact	-	e	-	Reinterred	Devereux and Hammatt 1999; McElroy et al. 2024
50-50-04-04477	Burial	Burial	Pre-Contact	-	e	-	Reinterred	Devereux and Hammatt 1999
50-50-04-04478	Burial	Burial	Pre-Contact	-	e	-	Reinterred	Devereux and Hammatt 1999
50-50-04-04479	Burial	Burial	Pre-Contact	-	e	-	Reinterred	Devereux and Hammatt 1999
50-50-04-04668	Burial Complex (n=38)	Burial	Pre-Contact	-	-	-	Preservation	On File, SHPD
50-50-04-05212	Subsurface cultural layer with pit features	Habitation	Pre-Contact	-	d	-	Preservation; Archaeological monitoring	Fredericksen and Fredericksen 2002
50-50-04-05213	Concrete slab	Warehouse foundation	Post-Contact (c. 1920s-1940s)	-	d	-	Preservation; Archaeological monitoring	Fredericksen and Fredericksen 2002
50-50-04-05471	Burial	Burial	Pre-Contact	-	e	-	Reinterred with SIHP 50-50-04-05495	Fredericksen 2005a

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-50-04-05472	Burial	Burial	Pre-Contact	-	e	-	Preservation, reinterred with 50-50-04-05495	Fredericksen 2005a
50-50-04-05495	Burial	Burial	Pre-Contact	-	e	-	SHPD consultation; Archaeological Monitoring	Fredericksen 2005a
50-50-04-05496	Subsurface cultural layer with waterworn basalt/coral pavement	Habitation	Pre-Contact	-	d, e	-	SHPD consultation; Archaeological Monitoring	Fredericksen 2005a
50-50-04-05660	Complex	Permanent Habitation	Pre-Contact	-	d	-	Archaeological Monitoring	Fredericksen 2005a
50-50-04-07493	Burial	Burial	Pre-Contact	-	d, e	-	Burial Treatment Plan, Archaeological Monitoring	Hodara and Dega 2015b
50-50-04-07494	Pit features, cultural lens, burials	Habitation, burial	Pre-Contact	-	d, e	-	Burial Treatment Plan, Archaeological Monitoring	Hodara and Dega 2015b
50-50-04-08498	Structural remnant	Commercial/ Residential	Post-Contact	-	d	-	None Provided	Royalty and Hammatt 2017
50-50-04-08738	Burial	Burial	Unknown	-	-	-	None Provided	On File, SHPD
50-50-04-09016	Ichiro “Iron” Maehara Baseball Stadium	Recreation	Post-Contact	-	-	A, C	No further work/SHPD consultation	FAI Architects 2023a
50-50-04-09017	Coach Soichi Sakamoto Pool	Recreation	Post-Contact	-	-	A, C	No further work/ SHPD consultation	FAI Architects 2023b
50-50-04-09018	Thomas "Cheena" Lau Hee Little League Field, Toshio "Tata" Fujimoto Baseball Field, and the associated Little League Fields' Restroom	Recreation	Post-Contact	-	-	A	No further work/SHPD consultation	FAI Architects 2023b

Note: historic properties located within the current project area are denoted by a gray highlight.

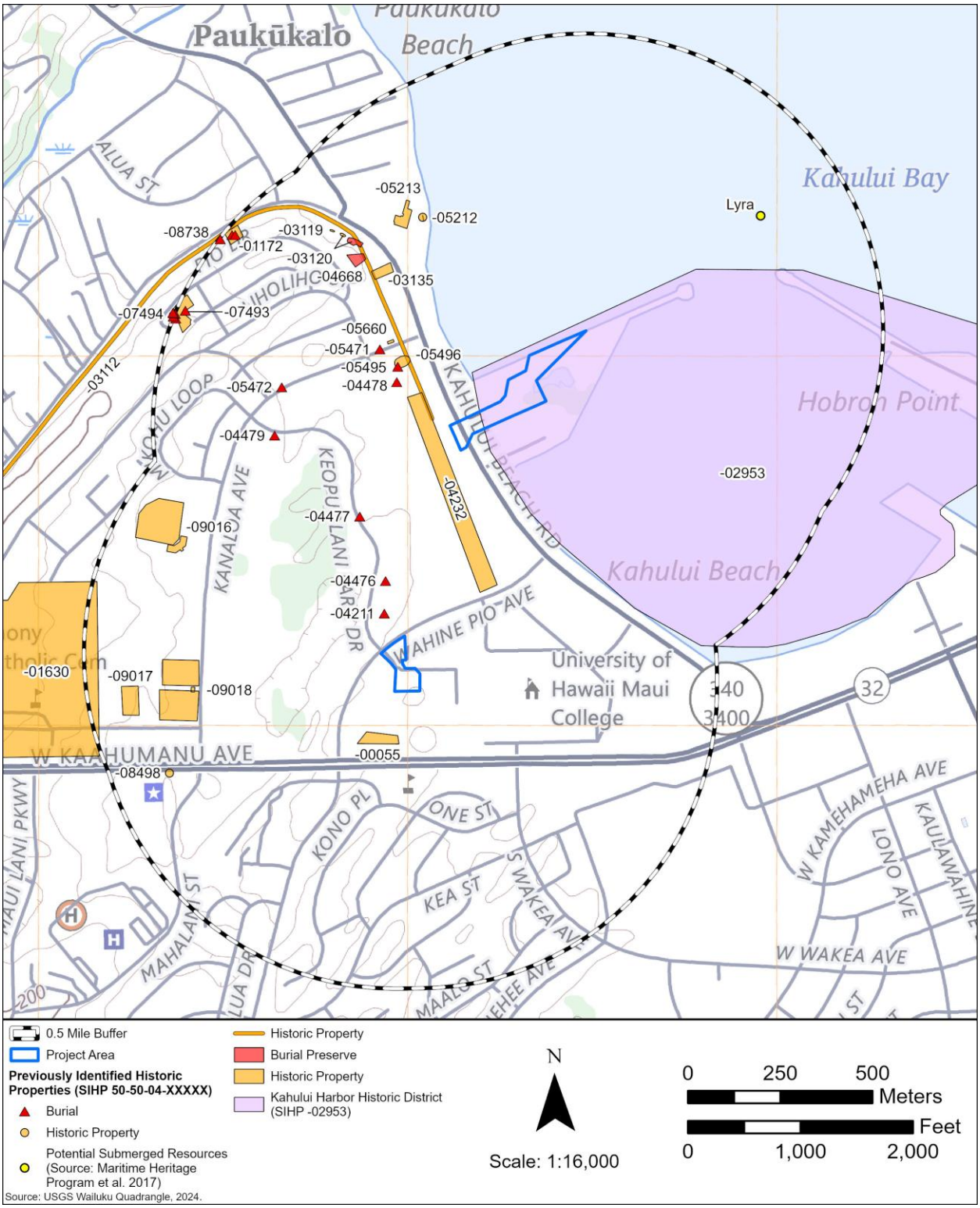


Figure 93. Previously identified historic properties within 0.5 miles of the Maui portions of the HIFL project area.

3.3.14 Summary of Archival and Background Research for the Maui Cable Landing Site

The *ahupuaʻa* of Wailuku is a vast and much-storied region. Wailuku is one of the "Four Waters of Maui," or *Na Wai Ehā*, along with Waikapu, Waiehu, and Waiheʻe, all of which were later grouped into a single district known as Na Poko. The meaning of the name Wailuku, often translated to "water [of] destruction," has been attributed to a late eighteenth century battle between Kalaniopuʻu and Kahekili known as "*Ahulau ka Piʻipiʻi i Kakanilua*," or "Slaughter of the Piʻipiʻi at Kakanilua." An alternate explanation attributes the name to the 1790 Battle of ʻĪao, also known as the "Battle of Kepaniwai," or "the damming of the waters."

There are many *moʻolelo* that relate to Wailuku, including significant places in and around the project area. This includes the broader Na Wai Ehā region, Kanahā and Mauoni ponds, the plains of Kamaʻomaʻo, and the Pihana Heiau complex. Some of the *ʻōlelo noʻeau* that refer to Wailuku speak to the battles that occurred there. Those that refer to Kahului mention the "swaying sea," the construction of the twin ponds Mauʻoni and Kanahā, and the momentous arrival of carrier pigeons to Kahului in 1893.

Before the introduction of commercial sugarcane agriculture radically transformed the landscape around Kahului, sweet potato plantations and fishing settlements lined the north coast of Maui, while irrigated *kalo* agriculture was practiced on the plains around the Wailuku River. The project area lies within the Pleistocene aeolian sand dunes that characterize most of the isthmus between East and West Maui. Marine resources were abundant around Kahului Harbor, and a wide variety of fishing techniques were practiced. This included bag net fishing, which was a method well suited to sandy areas like Kahului and Hilo Bay. Kahului continued to serve as a primary fishery with abundant marine resources into the post-Contact period.

During the Mahele, Wailuku Ahupuaʻa was designated as Crown Land. On the passing of Lot Kapuāiwa (Kamehameha V), the *ahupuaʻa* passed to his half-sister, Ruth Keʻelikolani. In 1882, Keʻelikolani sold a portion of these lands to Claus Spreckels, who continued to consolidate his landholdings in Wailuku for commercial sugarcane production. A number of LCAs were awarded in Wailuku, though most are located in the flood plains of ʻĪao Valley, far from the project area. A smaller number are clustered closer to the shore, just north of the project area. Many of the LCAs near the project area were awarded as land deeds by Kamehameha IV. A portion of the project area lies within LCA 420, awarded to H. Kuihelani.

Commercial sugarcane agriculture began in Wailuku on a small scale in the early 1800s, with a small number of mills and plantations. In the mid-1860s, disruptions to sugar supply from the American South brought new demand for sugar from Hawaiʻi. The proliferation of sugar plantations across Maui expanded further in 1876, when the Reciprocity Treaty eliminated the 40% tariff on sugars entering the U.S. from Hawaiʻi. Much of the infrastructural development in Wailuku through the nineteenth and early twentieth centuries was inextricably tied to the growth of commercial sugarcane agriculture. This included large-scale irrigation infrastructure which diverted water into sugarcane fields, the Kahului Railroad, Kahului Harbor, and much of the early development of Kahului Town.

Several large-scale disasters impacted Kahului in the 1900s. When an outbreak of the plague struck Kahului at the turn of the century, a portion of the town was burned to the ground and a quarantine was instated for several years. Kahului Harbor became a key location for Naval operations and military supply routes during WWII. At the end of 1941, at least 10 high-explosive shells were fired

at Kahului from what was believed to be an enemy submarine. The 1946 tidal wave caused damage to much of the area around Kahului Harbor, including the military infrastructure established during WWII, and the Kahului Railroad Company's general office, which contained many of the archival records that detailed Kahului's early development.

Maui Vocational School was built in 1931, and began as a single-story building with an automobile shop, carpentry shop, machine shop, electrical shop, classroom, and offices. HC&S later donated 11.5 acres of land for the school to expand, adding more shops and programs, as well as additional space for classrooms and administration. In 1958, Maui Vocational School was renamed to Maui Technical School. In 1965, it entered the University of Hawai'i Community College system and was renamed to Maui Community College. In 2010, the school was renamed to UH Maui College.

The Maui portions of the HIFL project area lies within a portion of the Kahului Harbor District. Other nearby historic properties include pre-Contact subsurface cultural deposits, habitation complexes, and burials, all of which are located to the north of the project area. Post-Contact historic properties include features associated with commercial sugarcane agriculture and related infrastructure, the development of Kahului Town, and the impacts of WWII.

3.4 MOLOKAI CABLE LANDING SITE

The Molokai portions of the HIFL project area are within the traditional *moku* (district) of Kona, in the *ahupua'a* (traditional land division) of Kaunakakai. Kona Moku encompassed the entire southern and western portions of the island, while Ko'olau Moku comprised the northeastern, or windward, portion of the island, extending from Hālawa Valley to Kalaupapa Peninsula (Summers 1971:2). Kaunakakai Ahupua'a is located within the central portion of Kona Moku. The *mauka*, or inland, portion of Kaunakakai extends to the summit of Wailau (also known as the East Molokai Volcano), where rainfall carves deep gulches along the volcano's flank, bringing *wai*, or fresh water, down to the coast. The coastal area is fronted by a fringing reef with a natural break, creating a small harbor.

According to Mary Kawena Pukui, the old name for Kaunakakai was Kaunakahakai, which translates as "beach landing" (Pukui et al. 1974:95), and likely references the use of the harbor as a "place for the canoes to come, for here there were plenty of fish" (Pukui, personal communication, cited in Summers 1971:87). The name Kaunakahakai also appears twice in Abraham Fornander's collection of traditional lore, gathered from Native Hawaiians in 'Ōlelo Hawai'i (Hawaiian language) and translated into English (Fornander 1917a:418-420, Fornander 1917b:574-575). While the English translation gives the name Kaunakakai, the original Hawaiian informants referred to the area as Kaunakahakai. The Reverend Stephen Desha in his 1920-1924 newspaper serial account, "A Tale of Kekūhaupi'o, the Famous Warrior of the Era of Kamehameha the Great," published in 'Ōlelo Hawai'i in *Ka Hoku o Hawaii*, also consistently gave the name as Kaunakahakai (Desha 2000:262, 274, 404). Hawaiian language newspapers also repeatedly referenced Kaunakahakai between 1861 and 1939 (Papakilo Database 2025).

3.4.1 Significant Place Names

A selection of place names associated with Kaunakakai Ahupua'a that are referenced in this document are listed in Table 13 and depicted in Figure 94 and Figure 95. Post-Contact place names in Kaunakakai Ahupua'a. Place names have been identified through Boundary Commission Testimonies and historic maps. Literal translations of place names have been added when they could be found in Pukui et al. (1974) or Pukui and Elbert (1986). A number of place names in Kaunakakai were identified by M.D. Monsarrat on an 1886 Hawaiian Government Survey map (Registered Map 1288), but do not appear in any other sources consulted for this report.

Table 13. Place Names Associated with Kaunakakai Ahupua'a

Place Name	Description	Map Source
Kaahukini	Stream and gulch	Monsarrat 1886 (RM 1288)
Kahuaawi	Stream and gulch. According to Pukui et al. (1974:66), just south of the gulch where it joins with Kalualohe Gulch is the last remaining *maika* (stone bowling game) course. Possibly a misspelling of Kahuawai.	Monsarrat 1886 (RM 1288); USGS 1952
Kākalahale	*Pu'u* (hill). "In the valley just southeast is the beginning of the 5-mile irrigation tunnel to Wai-kou Valley. *Lit.*, ridge house" (Pukui et al. 1974:71).	USGS 1952

Place Name	Description	Map Source
Kalaʻiakamanu, Malama	Pukui et al. (1974) identify Kalaʻiakamanu as the possible location of Kamehameha V's former home, Malama; *lit.* "the peace [made] by the bird" (Pukui et al. 1974:73).	Soehren 2019
Kalualohe	Stream and gulch, with tunnels that tap into groundwater (Pukui et al. 1974:79).	USGS 1952
Kamalae	*Heiau* (place of worship) at the foot of a ridge behind Kaunakakai town. According to Stokes, "Heiau entirely destroyed. It is said to have been for human sacrifice, and that the drums were heard at night" (as quoted in Summers 1971:87).	Summers 1971
Kaunakakai	Village, *ahupuaʻa*, gulch; an old name for Kaunakakai is Kaunakahakai, which translates literally to "beach landing" (Pukui et al. 1974:95) or "current of the sea" (Ne 1992).	Monsarrat 1886 (RM 1288)
Kōheo	Coastal area, formerly swamp; *lit.* "to show off *or* to twirl" (Pukui et al. 1974:115). Boundary point "at the shore between Kaunakakai and Kapaakea" (Soehren 2019).	USGS 1952
Māhinahina	*Heiau*. According to J.F.G. Stokes, "The site pointed out was a low platform lined with ala, on which a church stood…Said to have been for human sacrifice, and that the drums were heard at night" (as quoted in Summers 1971:88). The *heiau* was located on the shoreline and was destroyed; *lit.* "silvery haze (as of moonlight)" (Pukui et al. 1974:138).	Soehren 2019
Puu Luahine	*Puʻu*. According to Summers (1971), it is the location of the only remaining *kahua maika* (*maika* course) in the Hawaiian Islands.	Monsarrat 1886 (RM 1288)

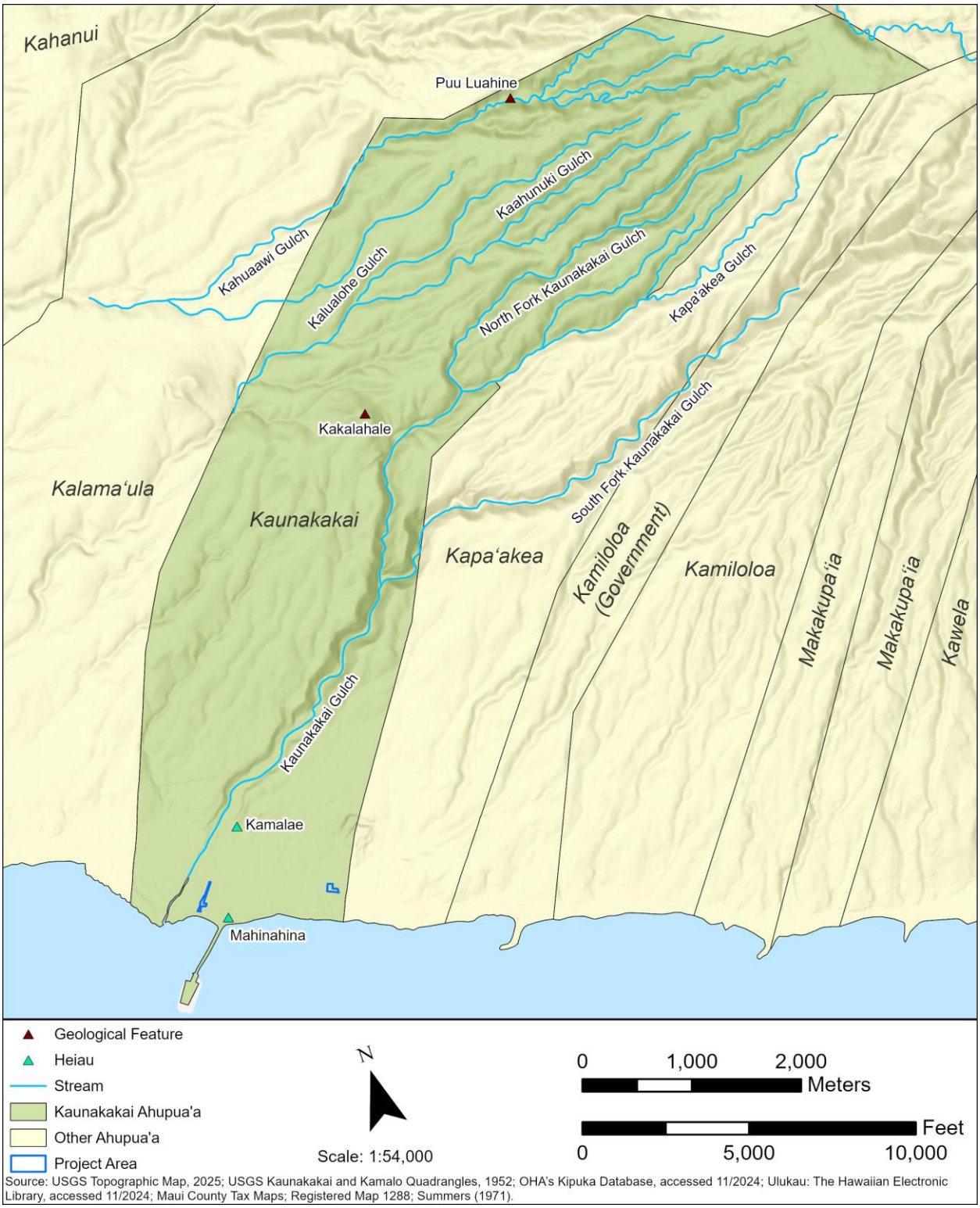


Figure 94. Traditional place names in Kaunakakai Ahupua'a.

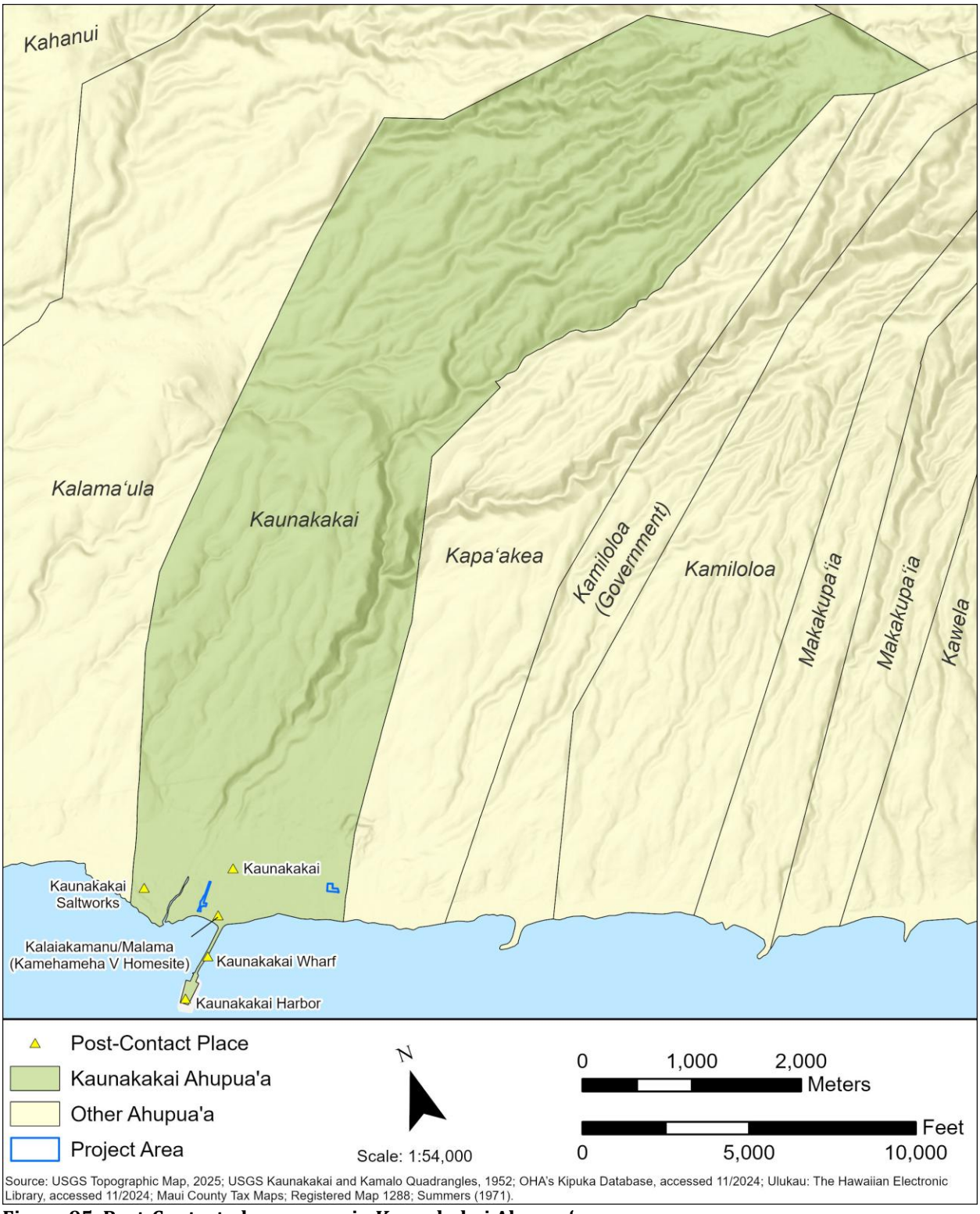


Figure 95. Post-Contact place names in Kaunakakai Ahupuaʻa.

3.4.2 Moʻolelo

Several *moʻolelo* (oral traditions) relate to Molokai, and specifically, to the area of Kaunakakai. These include *moʻolelo* which express the connection of Hina, a goddess or ancestor associated with the moon, with Molokai as well as the noted association of Kaunakakai as a landing place for canoes and for fishing.

Birth of the Hawaiian Islands

Fornander (1916) related a *mele* (song) composed by a *kahuna* (priest) named Pakuʻi during the time of Kamehameha I recounting the birth of the Hawaiian Islands from the union of Wākea and his wife Papa, ancestors of the Hawaiian people, and as a result of their separation and ensuing love affairs. The *mele* describes the birthing of the islands of Hawaiʻi, Maui, and Kahoʻolawe (named Kanaloa in the chant) by Papa from her union with Wākea before she departed for Tahiti. In her absence, Wākea took to wife Kaulawahine, who birthed Lanaʻi. He then became enamored with Hina, who conceived Molokai:

Haalele Papa hoi i Tahiti,	Then Papa left and went back to Tahiti.
Hoi a Tahiti Kapakapakaua.	Went back to Tahiti at Kapakapakaua.
Moe o Wakea moe ia Kaulawahine	Wakea then slept with Kaula wahine
Hanau o Lanai Kaula.	And Lanai Kaula was born,
He makahiapo na ia wahine.	The first-born child of that wife.
Hoi ae o Wakea loaa Hina,	Then Wakea turned around and found Hina,
Loaa Hina he wahine moe na Wakea,	Hina was found as a wife for Wakea,
Hapai Hina ia Molokai, he moku,	Hina conceived Molokai, an island;
O Molokai a Hina he keiki moku.	Hina's Molokai is an island child.
(Fornander 1917c:12-13)	

Upon her return from Tahiti, Papa became so angered at Wākea's wandering heart that she took Lua for a new husband, birthing Oʻahu.

In another version of the birth of the islands by the *kahuna*, Kahakuikamoana, Molokai is also associated with an ancestor named Hina, or Hinanuiakalana:

Na Kuluwaiea o Haumea he kane,	Kuluwaiea of Haumea as the husband,
Na Hinanuialana he wahine	Of Hinanuiakalana as the wife
Loaa Molokai, ke akua, he kahuna	Was born Molokai, a god, a priest,
He pualena no Nuumea,	The first morning light from Nuumea
(Fornander 1917c:2-3)	

Maniniholokuaua and Keliimalolo

Fornander (1918) related a story of two legendary men: Maniniholokuaua, who lived in Kaunakakai on Molokai and was known for his great strength, and Keliimalolo, who lived on Oʻahu and was known as the greatest runner on that island.

Maniniholokuaua's grandmother, Kalamaʻula, was a *moʻo* (water spirit) who lived in a large cave in the uplands. Maniniholokuaua would steal canoes and other valuables from people who landed at

Kaunakakai, and bring them to his grandmother. When Keliimalolo visited from Oʻahu, he landed at Kaunakakai and was told by many people there to bring his canoe into the canoe shed, or else Maniniholokuaua would carry it away. Keliimalolo was unswayed, as he knew himself to be the fastest runner on Oʻahu.

Maniniholokuaua arrived while Keliimalolo was bathing in a nearby pool, and lifted the canoe and its entire contents onto his back and ran off at great speed. Keliimalolo gave chase, but was unable to catch Maniniholokuaua before he arrived at the cave in Kalamaʻula. The cave opened for Maniniholokuaua to enter with the canoe, and closed again just before Keliimalolo arrived. Keliimalolo searched for a way to enter the cave, but found none. Dejected, Keliimalolo set off for Kauaʻi and recruited two fast runners from Niʻihau, Kamaakamikioi and Kamaakauluohia, to help him get his canoe back.

The three men boarded a double canoe and set out for Molokai. When they arrived, they repeated Keliimalolo's actions from the previous trip: they carried their canoe to the same place Keliimalolo left it on his previous trip, and went to the pool to bathe. Maniniholokuaua saw the canoe while it was still approaching from the ocean. However, his grandmother warned him that she had had a premonition that the sons of Halulu from Niʻihau, Kamaakamikioi and Kamaakauluohia, were on the canoe, and if that was the case then she and her grandson would be killed.

Maniniholokuaua did not listen to Kalamaʻula's warnings, and stole Keliimalolo's canoe once again. This time, Kamaakamikioi was fast enough to catch up with him. Just after Maniniholokuaua called to the cave to open up for him, Kamaakamikioi called for the cave to close. The cave closed onto Maniniholokuaua and killed him. Kamaakamikioi then called to the cave to open again, and he entered and killed Kalamaʻula. Within the cave were a wide variety of canoes and other valuables. Kamaakamikioi lit a fire at the cave to signal that he had killed Maniniholokuaua. This drew the people of Molokai to carry away the riches from the cave, but according to Fornander, "the people of the whole of Molokai were unable to carry away all of the things in the cave" (Fornander 1918:166).

The Fishing God and the Legend of ʻAiʻai

The *moʻolelo* of Kuʻula is found in Thrum (1901), originally authored by Moke Menu and translated by Moses Nakuina, which tells the story of Kuʻula, a man believed to possess *mana kupua* (miraculous or divine power) that allowed him to command all the fish of the sea. Kuʻula lived with his wife Hina on Maui and was renowned as an accomplished fisherman. While residing in Lehoula, he built a fishpond stocked with many kinds of fish and constructed a house on a stone platform dedicated to the fishing *kapu* (taboo, sacred), which he named after himself, Kuʻula. There, he made offerings of the first catch to the fish god. The reputation of his fishpond caught the attention of Kamohoaliʻi, Mauiʻs chief, who made Kuʻula head fisherman:

> Through this pond, which was well stocked with all kinds of fish, the kingʻs table was regularly supplied with all rare varieties, whether in or out of season. Kuula was its main stay for fish-food and consequently held in high esteem by Kamohoalii, and they lived without disagreement of any kind between them for many years. (Thrum 1901:115-116)

Kuʻula and Hina had a son named ʻAiʻai. As a young man, ʻAiʻai was given the tasked of killing a large *puhi* (eel) named Koona, who was stealing fish from Kuʻulaʻs pond. Koona lived on the Koʻolau side

of Molokai and was worshiped by the people there. ʻAiʻai succeeded killing in the eel and became famous among the people in Hāna. However, a man from Molokai who served as *kahu* (keeper) of the *puhi* sought revenge. When delivering a fish to Kamohoaliʻi from Kuʻula, he distorted the instructions, offending the *aliʻI* (chief). Enraged, Kamohoaliʻi told the people to burn Kuʻulaʻs house with him and his family inside. Before fleeing, Kuʻula gifted ʻAiʻai magical items and passed on his knowledge and authority:

> You must take this hook called 'manaiaakalani' with you; also this fish-pearl (pa hi aku), called 'kahuoi'; this shell called 'lehoula', and this small sand-stone from which I got the name they call me, 'Kuula-au-a-Kuulakai.' It is the progenitor of all the fish in the sea. You will be the one to make all the kuulas from this time forth, and also have charge of making all the fishing stations, (koa lawaia) in the sea throughout the islands. Your name shall be perpetuated, and that of your parents also; through all generations to come, and I hereby confer upon you all my power and knowledge. (Thrum 1901:119)

ʻAiʻai followed his father's instructions a travel around the islands establishing *koʻa* (shrines and fishing grounds). On Molokai, he landed at Punakou and traveled along the coast until he arrived at Kaunakakai. There he noticed a *pua* (fry, fish spawn) in the water and used his foot to kick it onto shore, a practice that continued into modern times only at this (Manu 2006:19 as cited in Lee-Greig et al. 2016).

3.4.3 ʻŌlelo Noʻeau

A selection of *ʻōlelo noʻeau* pertinent to Kaunakakai are compiled here, along with their translations and interpretations from Pukui (1983). Three of the *ʻōlelo noʻeau* compiled by Pukui (1983) reference Kaunakakai specifically. Two of these relate to Hikauhi:

> 742. Hele i Kaunakakai i Hikauhi.
> *Go to Kaunakakakai to seek Hikauhi*.
> Go to seek that which is lost. One day, when a man of Molokaʻi was fishing, his wife felt the beginning of labor pains and went to the upland to seek help from her mother. When the husband returned, he searched everywhere in Kaunakakai for his wife. After a time she returned with their daughter, whom they named Hikauhi.

> 1162. I Hikauhi, i Kaumanamana.
> At Hikauhi, at Kaumanamana.
> A man and his wife lived at Kaunakakai, Molokaʻi. While he was gone fishing one day, she felt the beginning of labor pains and went to her mother's home in another village. When the husband arrived home and his wife was not there, he began to search for her. After he had searched fruitlessly for several days, his wife returned with their baby daughter, whom they named Hikauhi. Ever since that day, *hikauhi* meant "in vain," and when a person loses something and goes in search, one says, "*I Hikauhi, i Kaumanamana."*

The final *ʻōlelo noʻeau* reflects the significance of Kaunakakai as an important gathering place, and associations with *aliʻi*:

> 2919. Wā ʻōlelo i Kaunakakai.
> Loud talking at Kaunakakai.
> Said of much boisterous talking. The chiefs liked to play games such as *kōnane* at Kaunakakai, and their shouts and laughter could be heard from some distance.

3.4.4 Settlement and Land Use

The southern coast of Molokai is most known for its marine resources. Here, the fringing reefs along the coastline, sheltered by the East Molokai Volcano from the intense rains and fierce seas that often batter the Koʻolau, or windward, side of the island, provided for a thriving marine environment, including an abundance and variety of fish. The utilization of these marine resources by the people of Molokai extended from the nearshore environment to the deeper pelagic waters as described by a nineteenth century observer:

> Scores of men, women and children [were] out on the coral reefs fishing. Some were out at a distance of nearly two miles in canoes. Others were nearer the shore, up to their waists in water, anxiously watching the movements of the finny tribes, which they would spear with remarkable swiftness whenever they made their appearance. Others, again, were in groups of ten to twelve, in the form of a crescent, and holding a light net, while one, detached for the purpose at a distance of a few rods, would come toward them, beating the water as he came, and drive the fish into the net, which the party would close by crowding in toward the center. (Bates as quoted in Coulter 1931:10)

A fishing practice unique to Kaunakakai was fish kicking. This method was related in the *moʻolelo* "Aiai, son of Ku-ula" (Thrum 1901), as translated by S.N. Emerson):

> After making the circuit of Lanai he went over to Molokai, landing at Punakou and travelled along the shore till he reached Kaunakakai. At this place he saw spawns of mullet, called Puai-i, right near the shore, so he kicked them with his foot and landed them on the sand. This practice of kicking fish with the feet is carried on up to this time, but only at that locality. (Thrum 1901:120)

The relatively calm fringing reefs also provided ideal conditions for the development of aquaculture. At least 58 *loko iʻa* (fishponds) were constructed along the leeward coast of Molokai, including within the vicinity of Kaunakakai (Figure 96) (Summers 1964:1, 4). While the highest concentration of *loko iʻa* was along the southeastern portion of the coast, fishponds stretched as far west as Punakou Ahupuaʻa along the leeward side of Maunaloa Volcano.

Other marine resources for which Kaunakakai was renowned included *aloalo* (squilla, or mantis shrimp; *Squilla* sp.):

> Kaunakakai was famous for a sea food which Hawaiians considered especially delicious with poi, the aloalo, or squilla, small crayfishlike crustaceans up to four inches long that live in holes in dead coral near the shore. The Hawaiians used to catch the males only, recognizing them by their jerky motion as they were drawn out of their holes, attracted by a small fish on a string. The females moved with a gliding motion. (Handy 1940:520)

Given the rich marine resources of the leeward coast of Molokai, it is not surprising that the population of Molokai was concentrated along the southern portion of the island. An 1853 population census of the Hawaiian Islands undertaken by the Hawaiian Government recorded a total population for the island of Molokai of 3,607, with the densest habitation along the southern, and in particular the southeastern, portion of the coast (Coulter 1931:20).

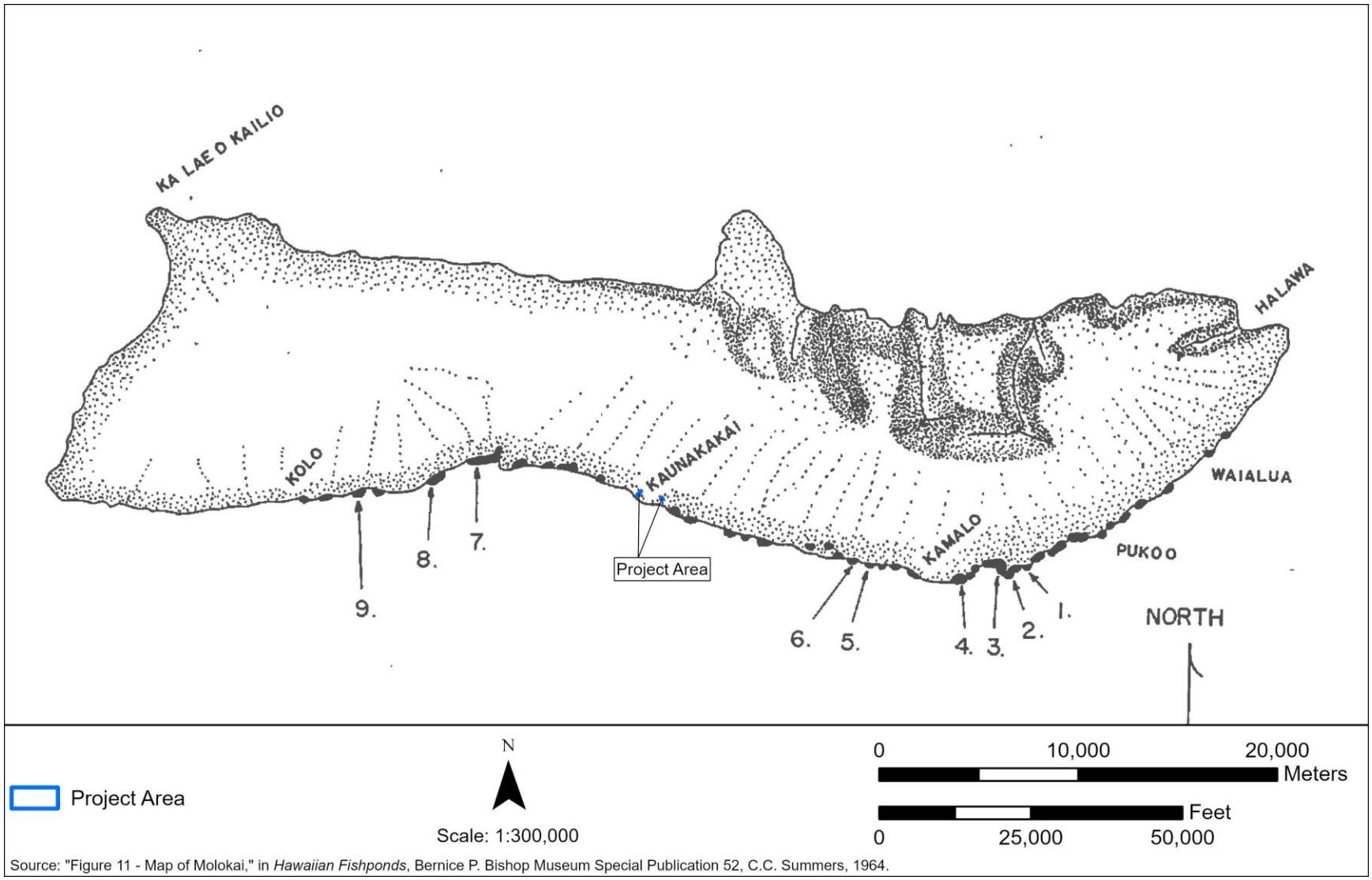


Figure 96. Map of the *loko iʻa* of Molokai, showing the fishponds strung along the leeward, or southern, coast of the island and concentrated in the southeastern portion (figure from Summers 1964:14) (Note: arrows indicate *ʻumeiki* type of fishponds, a style unique to Molokai).

The population distribution of Molokai was summarized by Coulter (1931) as follows:

> The outstanding characteristic of the distribution and density of people was the concentration along the eastern third of the south coast. The rainfall of the southeastern part of the island afforded sufficient water in the stream valleys for their lower flood plains to be used for wet land agriculture…
>
> Fish were easily procurable on most of the eastern half of the south coast. The configuration of the coast line and shallow off-shore water on the coral reefs are environmental features suitable for building many fish ponds. Of 53 fish ponds on Molokai, at least 35 were along the south coast of the island.
>
> The north coast of the island from Makanalua Peninsula eastwards was too rugged for occupation except a few flood plains on which about 500 Hawaiians lived. The land on the Peninsula was moderately peopled. Bates writes: at Kalaupapa "were scattered a number of dwellings belonging to the natives, besides numerous pasture lands and plantations."
>
> Nearly all the western half of the island was uninhabited. There the semi-arid climate precluded successful agriculture. (Coulter 1931:20)

The population was most concentrated between Keawanui and Kūmimi Ahupuaʻa on the southeastern coast (Summers 1971:3).

Although marine resources would have provided the most reliable source of sustenance for the inhabitants of the southern coast, dryland agriculture was also important. Handy and Handy (1972) made mention of dryland *kalo* (taro; *Colocasia esculenta*) and *ʻuala* (sweet potato; *Ipomoea batatas*) cultivation in the *kula* (open country, pasture) lands and near Kaunakakai:

> In 1931, potato patches were seen at various places near the road along the south coast, and Hawaiians said that many parts of the kula land used to be planted with both sweet potato and dry taro. It is safe to assume that potatoes were grown all along this coastal plain fringed with fishponds from Waialua to Punakou. On the slopes of Kakalahale and Luahine hills, between Kaunakakai and Kalamaula, there were potato plantations. (Handy and Handy 1972:517)

Other resources included non-agricultural dryland plants. In the *moʻolelo* of Palila, Kaunakakai was noted for its *pili* (grass; *Heteropogon contortus*) grass, utilized for house thatching:

> After a few days, Palila left Kahului because he [Kahului] was too stingy, and he again continued on his journey along the coast until he arrived on the rise of Hanauma [on Oahu], where he stood and looked at the heat as it ascended from the pili grass at Kaunakakai, Molokai. (Fornander 1918:148, Summers 1971:54)

Summers (1971) listed two *heiau* (places of worship) within Kaunakakai. Kamalae Heiau was located behind Kaunakakai Village, while Māhinahina Heiau was located on the coast. At the time of the 1909-1910 survey of Molokai by John F.G. Stokes, an archaeologist from the Bishop Museum, Kamalae Heiau had been completely destroyed. According to Stokes, "It is said to have been for human sacrifice, and that the drums were heard at night" (Stokes as quoted in Summers 1971:87). Stokes described Māhinahina Heiau as "a low platform lined with ala [*ʻalā*; dense waterworn volcanic stone], on which a church stood…Said to have been for human sacrifice, and that the drums were heard at night" (Stokes as quoted in Summers 1971:88).

3.4.5 Traditional Hawaiian Period

Around the time of the thirteenth century, Molokai was ruled by the first *aliʻi nui* (high chief), or *mōʻī* (sovereign), of the island, Kamauaua, who was descended from the sacred Nanaʻulu line of chiefs (Summers 1971:11). Little is known of the centuries immediately following as few *moʻolelo* have been retained and/or disclosed:

> The island of Molokai during this period, from Laamaikahiki [14th century] to Kukaniloko [16th century] and her contemporary Piilani, present no legendary lore of historical importance except the disaster which befell its principal chief, Kahokuohua, from the invasion of Kalaunuiohua, the Moi of Hawaii. (Fornander 1880:91, cited in Summers 1971:12)

(Fornander 1917a) Kahokuohua ruled Molokai roughly in the early part of the fifteenth century. The invasion of Molokai, as well as Oʻahu and Kauaʻi, by the *mōʻī* of Hawaiʻi, Kalaunuiohua, was succeeded over the ensuing centuries by many inter-island campaigns of conquest or interference, notably by the larger polities of Oʻahu, Maui, and Hawaiʻi, as well as friendly visitations and intermarriages of the *aliʻi*.

In the early eighteenth century, conflict between the Koʻolau chiefs and the Kona *aliʻi* of Molokai erupted due to the envy on the part of the Koʻolau chiefs of the fishing grounds between Kawela and Moʻomomi . At this time the powerful *mōʻī* of Oʻahu, Kūaliʻi, was staying in Hilo, Hawaiʻi Island and, hearing of the conflict, departed for Molokai via Maui. At Honokawai in Kāʻanapali, he was approached by a Kona *aliʻi*, Paepae, who had been seeking aid from Maui:

> When Paepae saw for himself that it was indeed Kualii he decided there and then to abandon his first idea of enlisting Kauhi's aid, and left in haste for Kekaha to notify the chiefs of his discovery and to ask their consent to the change in the programme. Upon his arrival at Kaunakakai he found that all the chiefs of Kekaha had gone to Kalamaula preparing for another battle to commence upon the arrival of Kauhi. (Fornander 1917a:418)

Upon Paepae's return journey to Maui, he found Kūaliʻi and his war fleet already en route to Molokai and pleaded for Kūaliʻi to support the Kona chiefs. Kūaliʻi agreed to support the defending Kona chiefs and turned for Kaunakakai:

> When Kualii heard this he immediately gave his consent and the canoes were again put to sea and they set sail for Kaunakakai where they arrived in due time. A council was then held by the chiefs, at the close of which they set out. The men were embarked on the canoes, while the Molokai chiefs and Kualii went by land until they reached Maamomi [Moʻomomi], where Kualii and the chiefs took the canoes and set sail for Kalaupapa. (Fornander 1917a:418)

After a final battle at Pelekunu, the chiefs of Koʻolau were defeated by Kūaliʻi and the Kona chiefs. According to Fornander, "The chiefs of Koolau then gave up to Kualii the whole of Molokai" (Fornander 1917a:420). Kūaliʻi redivided the lands then returned to Oʻahu, leaving Paepae and his wife Manau in charge of Molokai.

Following the death of Kūaliʻi, his son Kapiʻiohookalani invaded Molokai. Alapaʻinui, then the ruling chief of Hawaiʻi Island, had recently arrived in Kihei, Maui and learned of the attack on Molokai. As many of the Molokai *aliʻi* descended from the Keawe line of chiefs of Hawaiʻi Island, Alapaʻinui and

his forces came to the defense of Molokai, landing at Pukoʻo. Kapiʻiohookalani's forces were encamped at Kalamaʻula, and extended along the coastline from Kaunakakai to Nāʻiwa. They battled each other at a stalemate for four days. A decisive victory was won by Molokai and its allied forces on the fifth day, at Kawela:

> Every able-bodied man came out of his house to fight. The Molokai forces attacked from the hills, those of Hawaii from the sea, while a great number landed the from the fleet and fought on land. The battle began in the morning and lasted until afternoon. The ruling chief of Oahu found himself surrounded by sea and by land and hemmed into a small space. Ka-piʻi-oho-o-ka-lani died at Kawela below Kamiloloa, and many chiefs and fighting men were slaughtered, but some escaped and sailed for Oahu. (Kamakau 1961:70-71)

Following the death of Kapiʻiohookalani, his younger brother Peleʻioholani succeeded as *mōʻī* of Oʻahu. He continued the predations of the Oʻahu Kingdom, intermittently subjugating the Koʻolau chiefs. Bitter war erupted however when, for unknown reasons, the Molokai chiefs killed Peleʻioholani's daughter, Keʻelanihonuaiakama. In retaliation, Peleʻioholani violently slaughtered the chiefs and people of Molokai, forcing many to flee to the protection of Maui and Hawaiʻi Island. Oʻahu retained control of Molokai until the time of Kahekili, *mōʻī* of Maui.

3.4.6 Early Post-Contact Period

The early post-Contact period, a designation commonly given to the period following the 1778 arrival of Captain James Cook at Waimea Harbor on Kauaʻi, was a time of continued intense political maneuverings and warfare between the island kingdoms of Oʻahu, Maui, and Hawaiʻi Island, with Molokai swept up into these wider conflicts.

In 1782, the *mōʻī* of Maui, Kahekili, was determined to conquer Oʻahu and after undermining the rule of his *hanai* (adopted) son, Kahahana, *mōʻī* of Oʻahu, he launched his forces from Maui, landing first at Molokai "to secure fish from the walled fishponds for the journey, and their canoes reached from Hoʻolehua to Kaluakoʻi" (Kamakau 1961:135). With the utter defeat of Oʻahu, Molokai fell under the rule of Maui.

In 1790, Kamehameha conquered Maui by defeating Kahekili's son Kalanikūpule, whom Kahekili had left in charge of Maui while he resided on Oʻahu. Kamehameha then went on to Molokai. In Archibald Menzies' account of traveling to the Hawaiian Islands aboard the HMS *Discovery*, he described hearing about Kamehameha I's conquest of Maui in 1790, followed by his pursuit of Kalanikūpule and his army to Molokai, where Kamehameha had "conquered that and the other islands marking his progress in desolating the country by destroying the fields and plantations of the inhabitants…" (Menzies 1920:115). When the HMS *Discovery* sailed into Kaunakakai, Menzies made note of how they were not greeted by anyone, and were told that Kamehameha's conquest had devastated the island:

> After getting close in with Molokai, we bore up along the south side of it, and on coming off the west end made some tacks into a bay where we came to anchor late in the evening. We were visited by no natives or canoes of this end of Molokai. The people we had on board told us that Kamehameha's descent upon it had desolated the country, and that it had not yet recovered its former state of population. (Menzies 1920:118)

Kāʻeokūlani, the ruling chief of Kauaʻi, heard of Kamehameha's victory over Kalanikūpule, and decided to wage war against Kamehameha (Summers estimated this to have been around the year 1791; Summers 1971:20). Kāʻeokūlani and Kahekili joined forces and traveled to Molokai. Upon landing at Kaunakakai, Kāʻeokūlani remarked on the remains of Kamehameha's camp:

> The war party landed at Kaunakakai on Molokai, and when the Kauai chief saw for the first time, by the ovens they had left, the size of the camp which Kamehameha had occupied he said, "Where a big squid digs itself a hole, there crab shells are heaped at the opening." (Kamakau 1961:159)

Kahekili regained Molokai, and control of the island vacillated between Kamehameha and the chiefs of Maui until 1795, when Kamehameha conquered Maui then sailed on to Molokai. Summers (1971) noted that there are no mentions of battles between the people of Molokai and Kamehameha at this time, and speculated that he was perhaps able to conquer Molokai with little to no opposition. After taking over Molokai, Kamehameha would hold his councils in Kaunakakai, and it was there that he planned his conquest of Oʻahu (Summers 1971).

3.4.7 The Mahele

Within the *Buke Mahele*, a total of 55 *ahupuaʻa* were named and apportioned out for the island of Molokai; however, neither Kaunakakai nor Kaunakahakai was listed. According to an 1888 Interior Department record, Kaunakakai Ahupuaʻa was "omitted" during the Mahele:

> In report by the Surveyor General enclosing a list of unassigned lands which is attached, showing that 5240 acres of the above land is in the hands of Mrs. B. P. Bishop's Estate, having been granted by the Govt. without any title. Also states that said land was omitted in the Mahele of 1848. (Interior Department 1888, available at Hawaii State Digital Archives)

In an 1889 Interior Department document, it was recorded that the *ahupuaʻa* of Kaunakakai was owned in 1843 by Kalani Pueo:

> In letter from the Trustees of the Bishop Estate to the Min. of Interior enclosing a list of unassigned lands which is attached and informing him that Kalani Pueo who owned the above ahupuaa [Kaunakakai] in 1843, from whom Mrs. Bishop inherited same, was the rightful owner as shown by a statement furnished by the Surveyor General, therefore they have the right to occupy said ahupuaa. Report of the Govt. Survey Office, attached. To request the Legislature to confirm to the Estate its title to the above Ahupuaa. (Interior Department 1889, available at Hawaii State Digital Archives)

Sometime between 1843 and 1852, the land passed to Abner Pākī, father of Bernice Pauahi Bishop:

> In a letter from A. Paki to Min. of Interior. That the above Ahupuaa belongs to them, and that Anae [mullet; *Mugil cephalus*] is the tabu fish. (Interior Department 1889, available at Hawaii State Digital Archives)

No *kuleana* LCA awards for Kaunakakai or Kaunakahakai were awarded (Figure 100).

3.4.8 Kamehameha V

Kamehameha V (Lot Kapuāiwa) purchased Kaunakakai Ahupuaʻa in 1855 for $200. According to Judd, "In the desire to have a country estate, he bought up land and cattle from the resident Hawaiians and used Molokai as a vacation ground from his cares of State" (Judd IV 1936:9-10 as cited in Stine et al. 2014). His summer house on the beach of Kaunakakai was called Mālama ("Light") and was made of grass and built on the foundations of an older structure (Figure 97,Figure 98). Ne (1992) wrote that although Kapuāiwa had the front entrance of his house built to face east towards the rising sun, he was still able to "outsmart" the doorway *kapu* by pointing out that the true entrance to the house was the stone steps of the previous foundation:

> Now, the old foundation was bigger than the new house, thus leaving a platform all around it. And the stone steps on the old foundation went up from the sea, then turned. "*This* is my entrance, facing the sea, up onto the platform and then into the house. My entrance is coming up the steps from the sea and the exit is the same. When you leave the house, you go out on the west end and then you turn and my exit is coming down towards the ocean. Tell me, is this not in keeping with the *kapu*?" (Ne 1992:71)

Kalaʻiakamanu was a name given to the site of Kamehameha V's residence, Mālama. Pukui et al. (1974) translated Kalaʻiakamanu to mean "the peace [made] by the bird". This references a *mele* from the *hula kilu*, which mentions Laʻiakamanu:

Ula Kalaʻe-loa i ka lepo a ka makani;	Red glows Kalaʻe through the wind blown dust
Hoonuʻanuʻa na pua i Kalama-ula,	That defiles the flowers of Lama-ula,
He hoa I ka laʻi a ka manu—	Outraged by the croak of this bird,
Manu ai ia I ka hoa laukona.	That eats of the aphrodisiac cane,
I keke lau-auʻa ia e ka moe;	And then boasts the privileged bed.
E kuhi ana ia he kanaka e.	He makes me a creature of outlaw;
Oau no keia mai luna a lalo;	True to myself from crown to foot-sole,
Nuna ke aloha, peʻe maloko.	My love I've kept sacred, pent up within.
Ike ʻa I ka uwe ana iho.	He flouts it as common, weeping it forth—
Pela ka hoa kamali—	That is the way with a child-friend;
He uwe wale ke kamalii.	A child just blubbers at nothing.
(Emerson 1998:239)	

Here, Emerson wrote "laʻi a ka manu" as a phrase which translated to the "croak of this bird," or "peace" (*laʻi*), as translated by Pukui et al. (1974). However, Emerson acknowledged that some claimed that Laʻiakamanu was a proper name, referencing "a place near Kalaʻe" (Emerson 1998:239). According to Ne (1992), Laʻiakamanu got its name ("Ka Lae o Ka Manu") because it served as a home to migratory *kōlea* (Pacific golden-plover; *Pluvialis fulva*) birds.

The beach in front of Mālama was a secluded white sandy beach reserved for *aliʻi* to use for sunbathing. It was called the "Royal Sands," because Kamehameha V and John Owen Dominis, husband of Princess Liliʻuokalani, both liked to go there to sunbathe (Ne 1992, Summers 1971). Roughly 50 feet west of Mālama, Kamehameha V built residences for Dominis and Charles Judd, a prominent businessman and politician (Cooke 1949). Mālama was described in an 1870 article in the newspaper *Ke Ai ʻOkoʻa*, quoted in Summers (1971:23):

> The king's own vacation house is called Malama. It is close to the edge of the sand and if the tide is very high, the murmuring wavelets wash up and whisper to the grains of earth which were rubbed off the royal feet at the threshold of the entrance leading to the lanai.

> It is a grass hut, skillfully thatched, having a lanai all around, with floors covered with real Hawaiian mats. The house has two big rooms. The parlor is well furnished, with glass cases containing books in the English language… This is a very good vacation house for the king, in spite of that sun baked area.
>
> On the northwest side of the house is a large grass house, and it seems to be the largest one seen to this time. The house is divided into rooms and appears to be a place in which to receive the king's guests. There are four other fine, big houses, mostly thatched. These are surrounded by the houses of those who wait on him and some are houses used for storage.
>
> The royal residence is set apart from the rest by a wooden fence that encloses it on all sides except the sea side. The king's yard covers about three acres and is planted with trees, mostly coconuts, that are thriving nicely. Another reason why we admire it so is that we saw no faucets since we left Honolulu, but when we got there we saw "the water that sleeps in the houses of men." (Holoholopinaau 1870, as quoted in Summers 1971:23)

Ne described the nearby spit of sand which served as a home to migratory *kōlea* birds, perhaps the reason for the name Laʻiakamanu, or "Ka Lae o Ka Manu":

> From Tahiti they came, the *kōlea* birds, forty of them flying in a single flock, and four flocks that came, one after the other. First they alighted on the island of Kauaʻi, but it did not please them, so they flew to Oʻahu. Some of them stayed on Oʻahu, but the rest came to Molokai.
>
> They were exhausted by their long flight and settle down on this point, on a sand spit in front of Malama at Kaunakakai, feeding on a kind of small red bird that is faintly flavored with salt. (Ne 1992:44)

According to Cooke (1949), Ka Lae o ka Manu was also the name of the platform on which Kamehameha V built Mālama. Mālama was still standing in 1908. However, it was later moved to a lot in the village owned by William Kamakana and his wife.

To the west of the project area is the coconut grove said to have been planted by Kamehameha V, which extends for roughly 10 acres with nearly 1,000 trees (Handy and Handy 1972) (Figure 99). According to Ne (1992), Kapuāiwa would walk to the coconut grove every day.

Kamehameha V can also be credited for the introduction of Longhorn cattle and Axis deer (*Axis axis*) to Molokai (Cooke 1949). The exact origins of the Axis deer are unclear. Some accounts say that they were a gift from Hawaiʻi's consul to Japan (Apple and Apple 1972), while others say they were a gift from the Emperor of Japan himself (Honolulu Star-Bulletin 1936). Perhaps instead they were received from the Duke of Edinburgh, who was actually the recipient of the Emperor of Japan's gift, and in turn re-gifted the deer to Kamehameha V (Apple and Apple 1972). Sophie Judd Cooke asserted that they were a gift from Dr. Hildebrand, a botanist of Hawaiʻi, and they had arrived from India by way of Hong Kong via the Scottish vessel, *Loch Na Garr* (Cooke 1963). By all accounts, the deer arrived to Honolulu in the mid-1860s and were subsequently released on Kamehameha V's favorite island of Molokai.

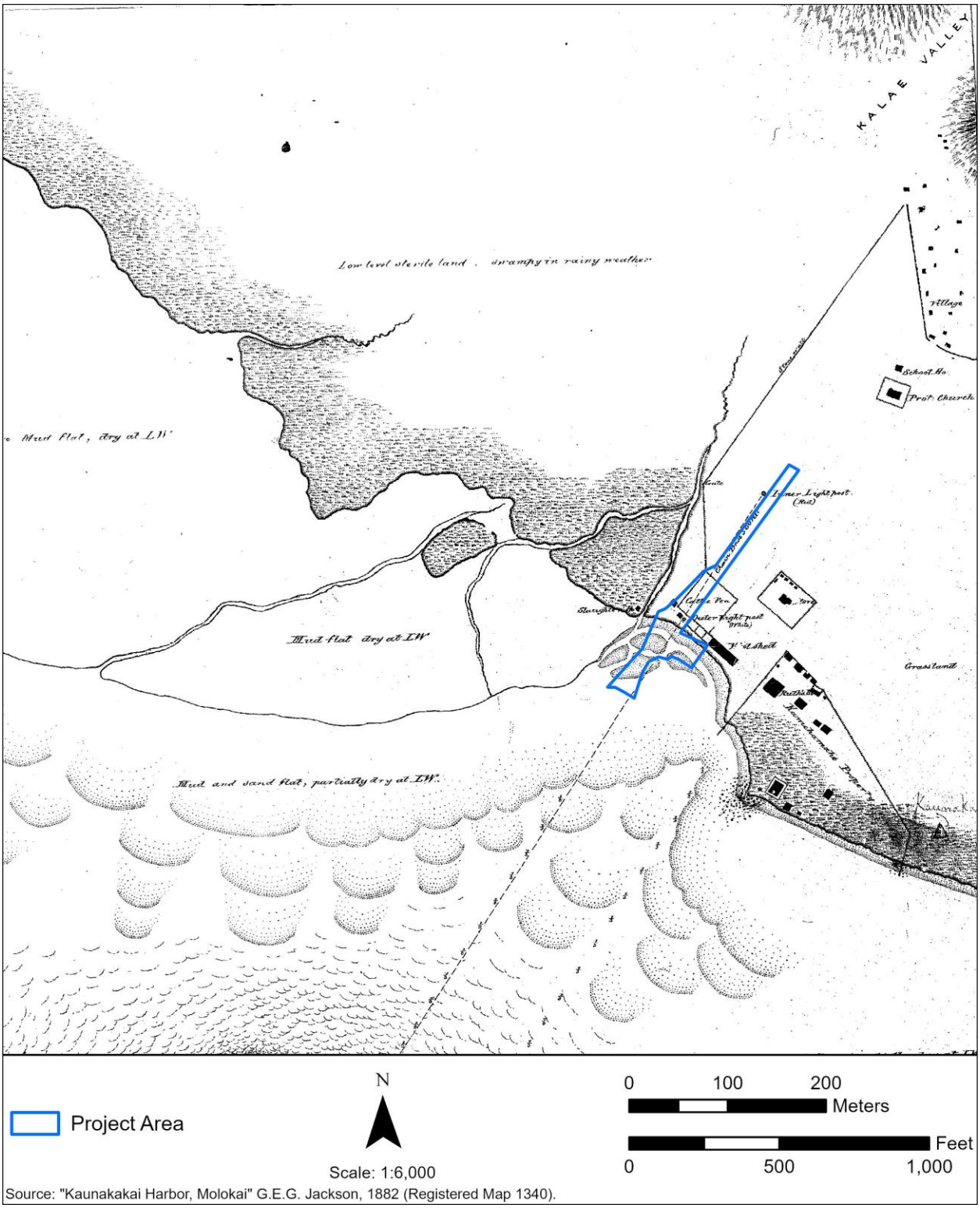


Figure 97. An 1882 map by G.E.G. Jackson, showing the Kamehameha V compound to the southeast of the Molokai Yacht Club portion of the HIFL project area. The Kamehameha compound is bordered on the *mauka* side by an area of "Grassland" while a "Cattle Pen" enclosure is located to the northwest, which extends into the Molokai Yacht Club portion of the project area.

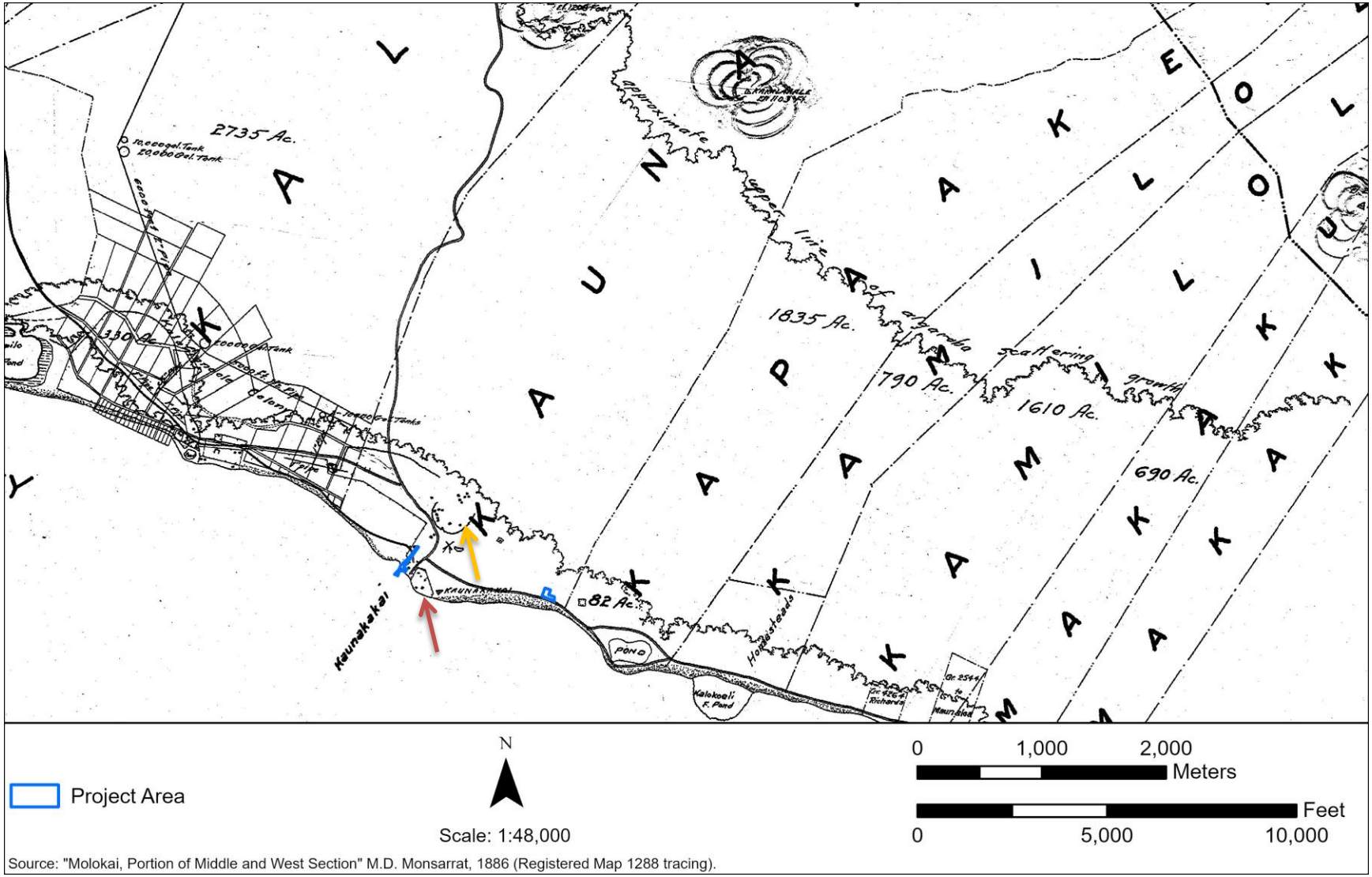


Figure 98. An 1886 map showing the Molokai portions of the HIFL project area within Kaunakakai Ahupuaʻa, with the Molokai Yacht Club portion located in the vicinity of the Kamehameha V compound (red arrow) and the walled Kaunakakai Town (orange arrow).

3.4.9 Nineteenth Century Salt Works

Prior to assuming the crown in 1863, Kapuāiwa served as the Minister of Finance for his brother, Alexander Liholiho (Kamehameha IV). Ne (1992) related a story about Kapuāiwa being unable to raise money on Molokai after the sandalwood had been depleted. Kamehameha IV had recently been impressed by his conversations with a British count and sent the count to Molokai to be hosted by Kapuāiwa, in hopes that he may have ideas for how to raise money there. While sunbathing on the Royal Sands with Kapuāiwa, as well as Chief Keʻeaumoku, Chief Kaʻiana, and Chief Kalaimoku, the foreign count had the idea to build salt beds in the area, following the same technique as was used to build *loʻi* (taro pondfields). According to Ne (1992):

> Then [the British count] sprang to his feet and turned excitedly to Kapuāiwa. "Oh *aliʻi nui*," he exclaimed, "may my words seem good to you. Have your men dig *loʻi*, or paddies, where the sea water comes. In this way, the little inlets will hold the water until the sun makes it vanish or until it sinks into the earth. But the salt will remain behind. You can have your own salt beds here, and supply other districts as Koʻolau does. When the cavities are thickly crusted with salt, you can ship it in bags to Honolulu and sell it." (Ne 1992:73)

The first large scale salt works on Molokai, created during the reign of Kamehameha V, was located in Kawela Ahupuaʻa to the east of Kaunakakai and called Kahapaʻakai (Dibben-Young in Pactol 2012). At the turn of the twentieth century, the Kaunakakai Salt Works was established on 15 acres along the coastal banks of Kaunakakai Stream (Figure 102). According to Molokai historian Dibben-Young, "At one time, Kaunakakai salt works was one of the largest producers of salt exported to the mainland from Hawaii" (Dibben-Young in Pactol 2012).

One of the "Tapes of Conversations with Native Hawaiians" transcribed by Pukui and related by Summers (1971) described the salt from the Kaunakakai Salt Works:

> …the salt pans were made "something like a taro patch." Sea water was run into the pans at high tide, and when the tide ebbed, some of the water remained. The water was allowed to stand from one to three weeks, after which the salt was gathered and dried. The salt formed here was not as salty as the salt formed by waves from the deep sea--"Our salt here is not too sour, the salt is white." (Summers 1971:87)

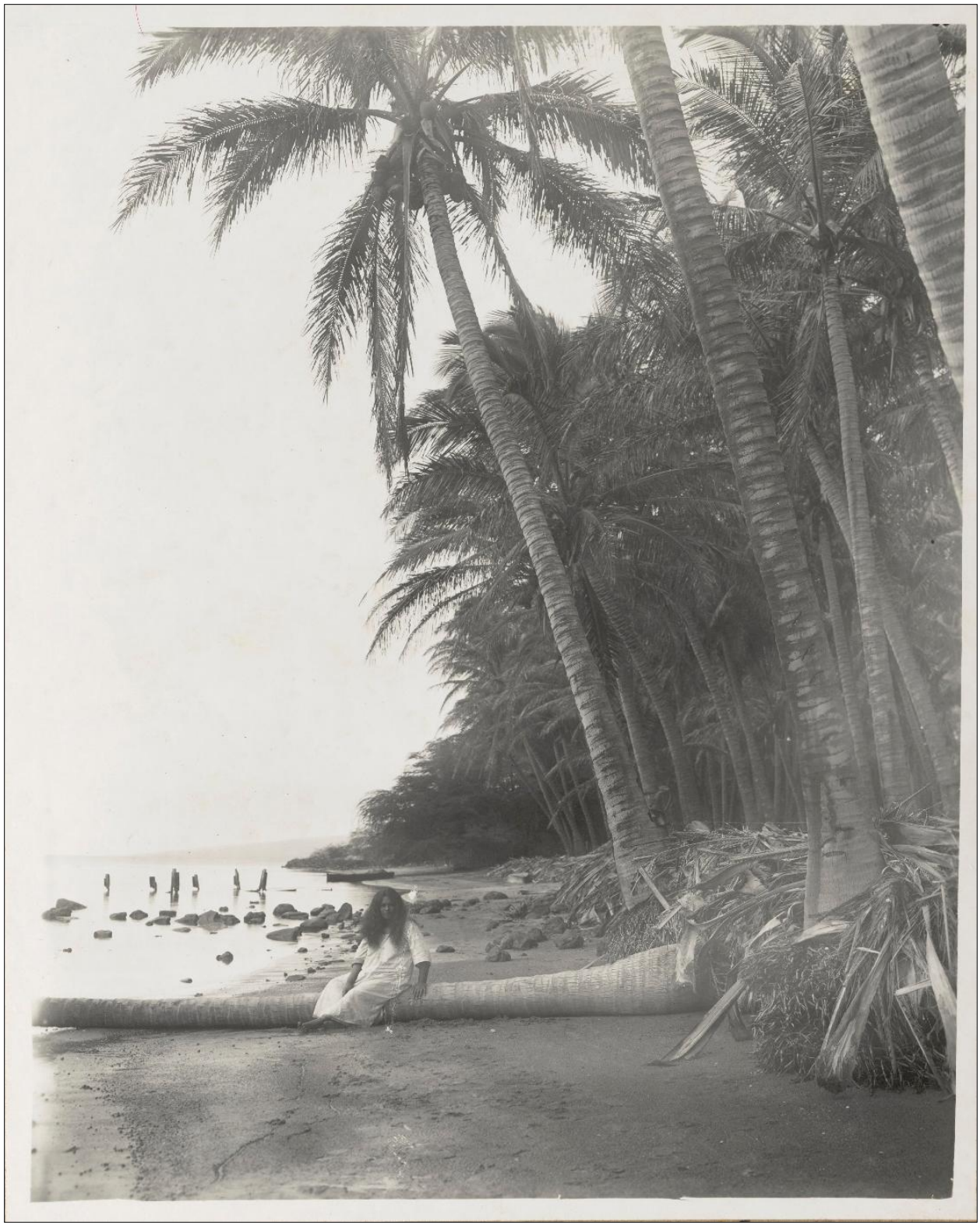


Figure 99. A 1912 photograph by R.J. Baker, titled "Molokai – (Beach) Kaunakakai," showing the coconut grove said to have been planted by Kamehameha V (Hawai'i State Digital Archives; Ref. No. PPWD-11-6-022).

3.4.10 Kaunakakai Harbor and Wharf

The freshwater springs located offshore near Kaunakakai prevented coral growth in this area, which in turn provided a natural break in the reef whereby boats could access the shoreline and find calm waters with good fishing. According to George Cooke (1949), during the nineteenth century, Kaunakakai Harbor was frequented by small schooners to transport supplies and victuals. As there were no constructed wharf facilities at this time, the method of loading and offloading consisted of hauling ox-carts over the reef to a depth deep enough for schooners to pull up alongside.

Following the death of Bernice Pauahi Bishop, the entirety of Kaunakakai Ahupua‘a was formally awarded to the trustees of her estate as part of Royal Patent Grant 3533, which was awarded on April 3, 1891 (Figure 100). The grant stated the following:

> Whereas by an Act entitled “An Act to Settle the Title to certain Unawarded Lands and to Authorize a Compromise with the Trustees under the Will of the late Bernice Pauahi Bishop,” approved on the 14th day of November A.D. 1890, it was enacted that upon the Delivery to the Minister of the Interior of a quit-claim Deed from the Trustees under the Will of the late Bernice Pauahi Bishop of all of their interest in and to the following tracts of land…
>
> A patent shall issue to said Trustees for the following land viz. the Ahupuaa of Kaunakakai, Molokai… And whereas a quit-claim deed of said premises has been delivered by the Trustees under the Will of Bernice Pauahi Bishop to the Minister of the Interior… (Royal Patent Grant No. 3533, available via the OHA Kipuka Database)

In 1897, Molokai Ranch purchased Kaunakakai Ahupua‘a from the Bishop Estate (Summer 1971, as cited in Lee-Greig et al. 2016). The following year, the ranch incorporated the American Sugar Company (ASCO). In 1898, the ASCO constructed the first wooden wharf on wood pilings at Kaunakakai. In 1899, ASCO added a half-mile long pier (mole) at Kaunakakai, which was built using rock from a *heiau* (Figure 103, Figure 104). According to Cooke, the *heiau* “is the site of the upper house of the Hawaiian Homes Commission, above their well in Kalama‘ula, called Oloolo (Cooke 1949:71). Extending atop the pier was a narrow-gauge railroad track to transport freight out to the docking platform:

> When I moved to Molokai [1908] the mole was just wide enough for one railroad track. All freight was carried over the wharf by flat cars drawn by mules. This track extended inland as far as Chang Tung’s store. (Cooke 1949:72)

Under ASCO’s purview, the wharf was repaired and maintained. However, disputes between ASCO and the Territory over the wharf’s maintenance continued into the early 1900s. In 1923, $125,000 was appropriated by the Legislature to dredge the harbor and construct a new wharf. In the same year, the harbor was dredged to a depth of at least 23 feet. It was not until 1927, however, that the appropriation from 1923 was spent to construct a new concrete wharf, which replaced the old wharf in 1928. The Manager’s Annual Report from 1940 indicated that a further $75,000 had been appropriated to extend the wharf inland, which would relieve congestion by allowing barges to load and unload on the inland side of the wharf (Cooke 1949:75).

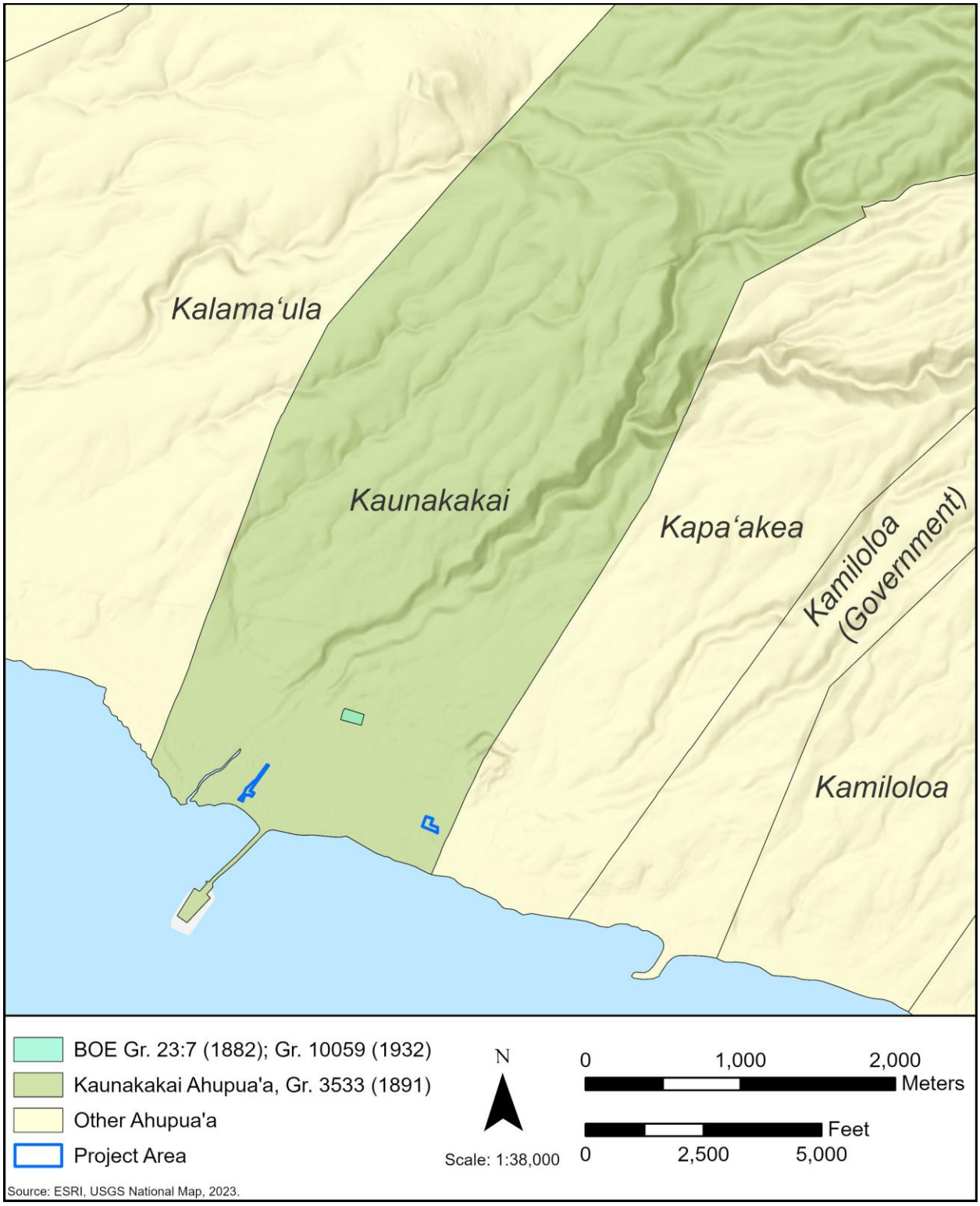


Figure 100. Map showing Land Grants in Kaunakakai Ahupuaʻa, identified through archival research.

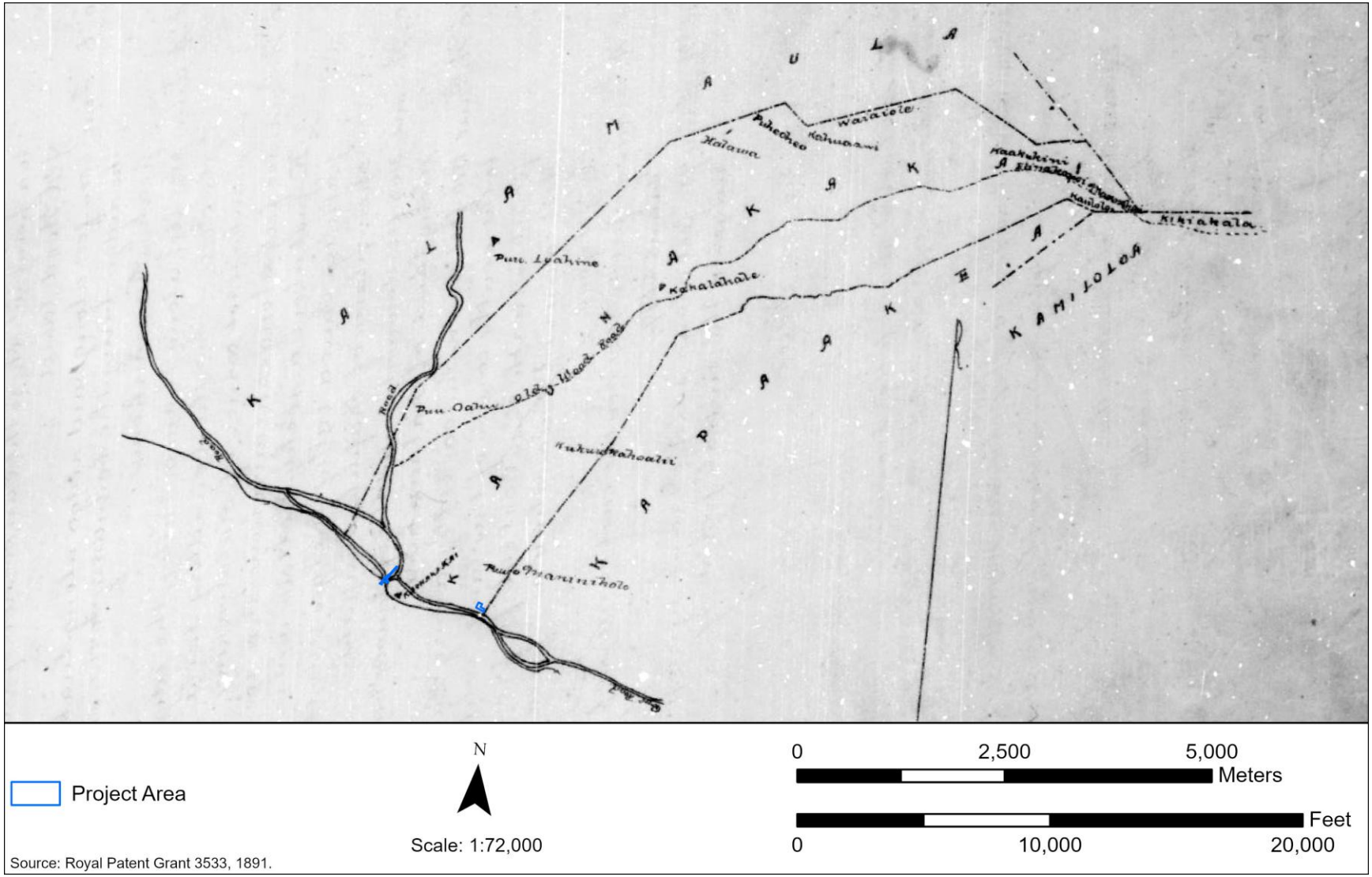


Figure 101. Survey map included within Royal Patent Grant 3533, showing the boundaries of Kaunakakai Ahupuaʻa (Royal Patent Grant No. 3533, available via the OHA Kīpuka Database).

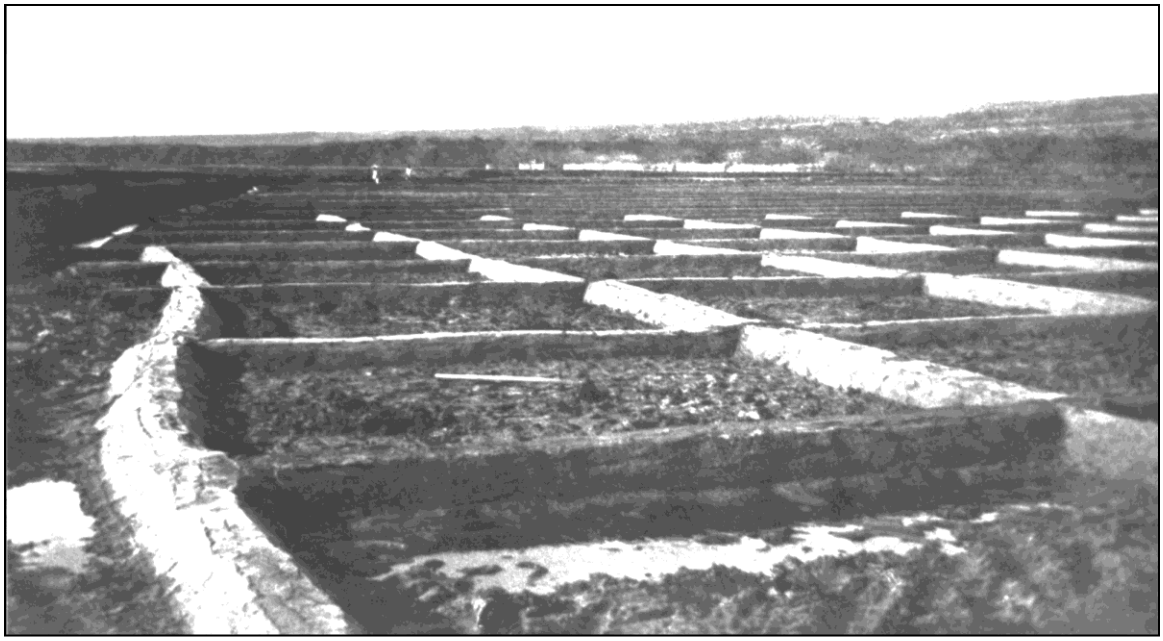


Figure 102. Circa 1901 photograph of the Kaunakakai Salt Works (Dibben-Young in Pactol 2012).



Figure 103. A 1931 photograph of Kaunakakai Wharf (U.S. National Archives and Records Administration).



Figure 104. Circa 1918 photograph of George Cooke holding a fish on Kaunakakai Wharf; Note the narrow-gauge railroad tracks leading to the wharf loading platform (Hawai'i State Digital Archives; Ref. No. GPNBAK-1-26).

3.4.11 Kaunakakai Town

The new wharf at Kaunakaki brought new business and transportation access to the area, helping to estabilish Kaunakakai Village as Molokai's urban and commercial center in the twentieth century (Lee-Greig et al. 2016). A series of historical maps and aerial photographs depicts the growth of Kaunakakai Town during this time period (Figure 105 through Figure 112).

Despite initial promise, the sugar industry on the island was short-lived due to irrigation challenges (Lee-Greig et al. 2016). In the early 1920s, a new industry arrived in Molokai: pineapple. During that time, the Libby, McNeil & Libby Pineapple Company began leasing the land of Kaluakoi from Molokai Ranch for pineapple cultivation (Cooke 1949, Gross et al. 2022). The California Packing Company (Calpac) soon followed, building over eighty structures in Kaunakakai to house workers and store agricultural supplies (Lee-Greig 2018). Kaunakakai remained the island's main shipping port and vital to the island's economy throughout the mid-twentieth century (Lee-Greig et al. 2016, Gross et al. 2022).

While pineapple expanded, cattle ranching remained the primary economic activity within Kaunakakai Ahupua'a (Lee-Greig 2008, as cited in Lee-Greig et al. 2016). In 1925, Standard Oil of California built fuel tanks in Kaunakakai on the former site of Mālama's retainers houses, which had burned down earlier (Cooke 1949). These tanks, operated by Molokai Ranch, supported the island's agricultural and transportation needs (Gross et al. 2022).

By the late 1920s, Calpac had introduced a block farm system that organized Native Hawaiian homesteaders into groups of twelve to fifteen contiguous parcels (Lee-Greig et al. 2016). Homesteaders were responsible for planting, maintaining and harvesting pineapple crops. The profits from the harvest were shared proportionally among the participants and the fruit was transported to Kaunakakai, where it was crane-loaded onto barges and shipped to Calpac's cannery in Kahului, Maui (Lee-Greig et al. 2016).

Residential development in Kaunakakai Town followed a different model. Rather than being part of the Hawaiian Homestead program, many homesteads were affiliated with the Territory of Hawai'i. As the town expanded, water supply and flooding became pressing issues. Cooke wrote in 1948:

> Early in the morning on Monday, January 26, a "flash flood" hit the town of Kaunakakai and although there was no loss of life, great property damage to the extent of fifty thousand dollars ensued.
>
> The residents of the town were warned of the high waters and impending flood, and many were evacuated from the danger area by residents and members of the 298th National Guard. They were supplied with food and shelter by the American Red Cross. In a very short time, two and one-half feet of water flowed through the streets of the town and it was said to have reached a depth of four feet in some places. (Cooke 1949:28)

In response, water management projects were initiated in the 1950s: Kaunakakai Stream was channelized into a single, controlled outlet, and a 5.5-mile tunnel was constructed along the upper portion of the Kaunakakai Gulch, to deliver water from Kualapu'u reservoir (Summers 1971, as cited in Lee-Greig 2018). In 1935, Kaunakakai Town was officially established as the seat of the island's government when all county buildings were relocated from 'Ualapu'e (Gross et al. 2022). A new library was constructed in 1936-1937 on the former site of Cooke Hall and military barracks

(Moy 1993, as cited in Lee-Greig 2018). During the same time, the district court and tax office were relocated from Pukoʻo to Kaunakakai, and a wireless telephone system was installed (Cooke 1949).

In 1970, Dole Pineapple Corporation acquired Libby, McNeil & Libby's pineapple operations in Molokai. However, due to decline in profitability in the global market, Dole began scaling back in 1982, and by 1989, commercial pineapple production on the island had ceased completely (Gross et al. 2022). This marked the end of an industry that had sustained the island's economy for over 80 years.

Despite the end of large-scale agriculture, Kaunakakai remained Molokai's major urban center, (Stine et al. 2014). Tourism, government services and other service-related industries replaced commercial agriculture as the primary sources of employment. Present land use in the Kaunakakai area is concentrated on municipal, retail, and domestic service functions associated with the town's role as Molokai's residential, commercial, and civic center (Lee-Greig 2018).

3.4.12 Molokai Education Center

In 1970, Maui Community College began offering off-campus courses in Hotel Operations and Liberal Arts at Kaunakakai Elementary School (Molokai Education Center- The College on Molokai n.d.). At the time, essential support systems such as library access, academic advising, and financial aid were mostly unavailable. By the early 1980s, agriculture was the first full-time college degree accessible to Molokai residents. As enrollment increased, the need for a dedicated facility became evident. In 1986, Maui Community College secured a 2,000-square-foot rental facility in Kaunakakai town, establishing the first campus of Molokai Education Center. That same year, the first cable courses were broadcast to the island (Molokai Education Center- The College on Molokai n.d.).

The last decade of the twentieth century was marked by progress toward a permanent campus. With the support from the State Legislature and a land donation from Molokai Ranch, construction began on a new facility at a site in Kaunakakai selected by both the community and the University of Hawaiʻi Board of Regents (Molokai Education Center- The College on Molokai n.d.). The permanent Molokai Education Center campus opened in 1999, serving as the central hub for all UH programs on Molokai. In addition to academic programs, the college supports the community through initiatives in career exploration and workforce development (University of Hawaiʻi Maui College 2025). Among all UH campuses, it has the highest Native Hawaiian enrollment, averaging approximately 80% each semester (Cluett 2015).

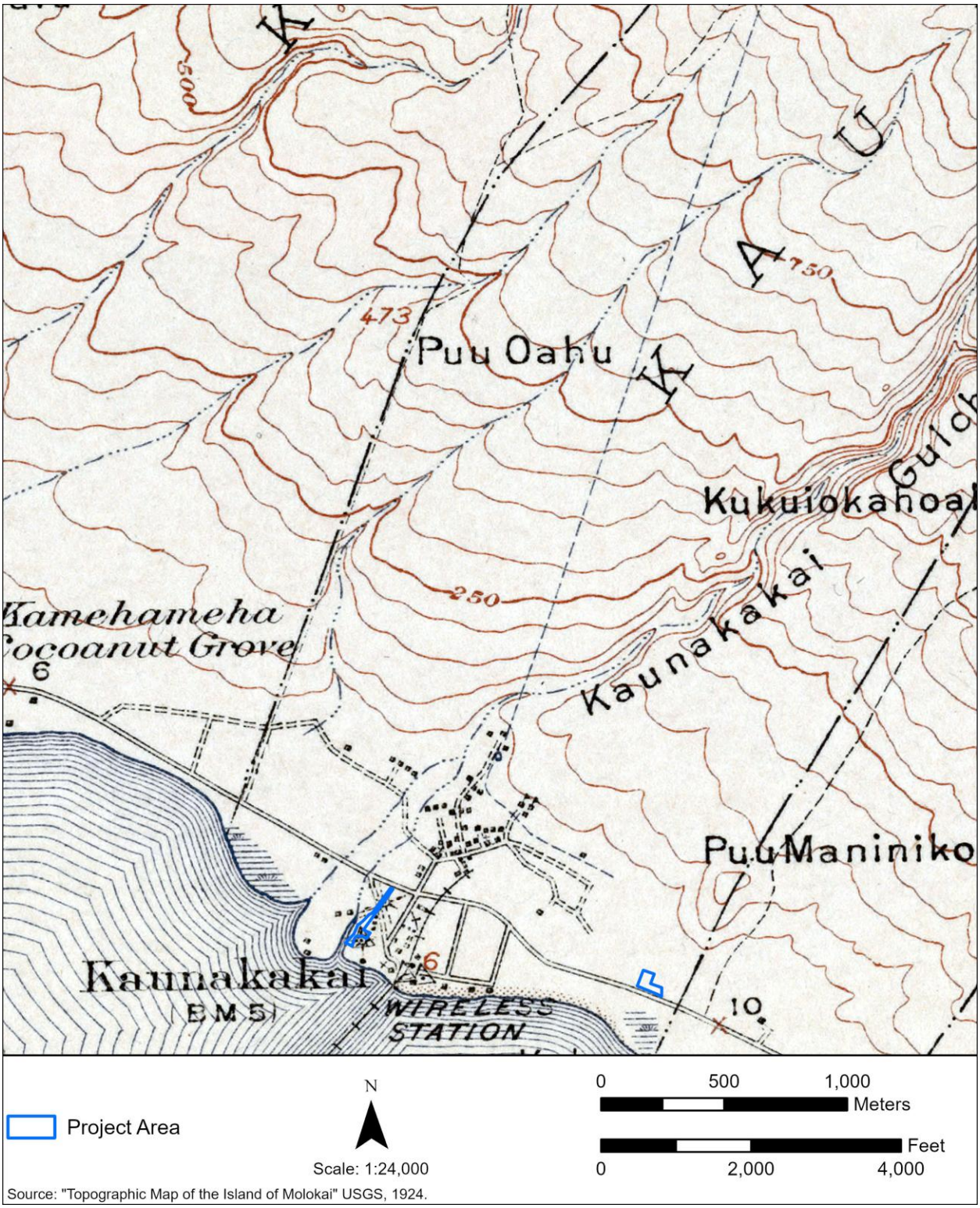


Figure 105. A 1924 USGS topographic map of Molokai, showing Kaunakakai Town located on the coastal plain and comprised of scattered dwellings with mainly unpaved streets (dashed lines). The wharf railroad track is depicted extending from the pier up to Kaunakakai Town.



Figure 106. A 1943 photograph of Kaunakakai showing Kaunakakai town and wharf (U.S. National Archives and Records Administration 2025).

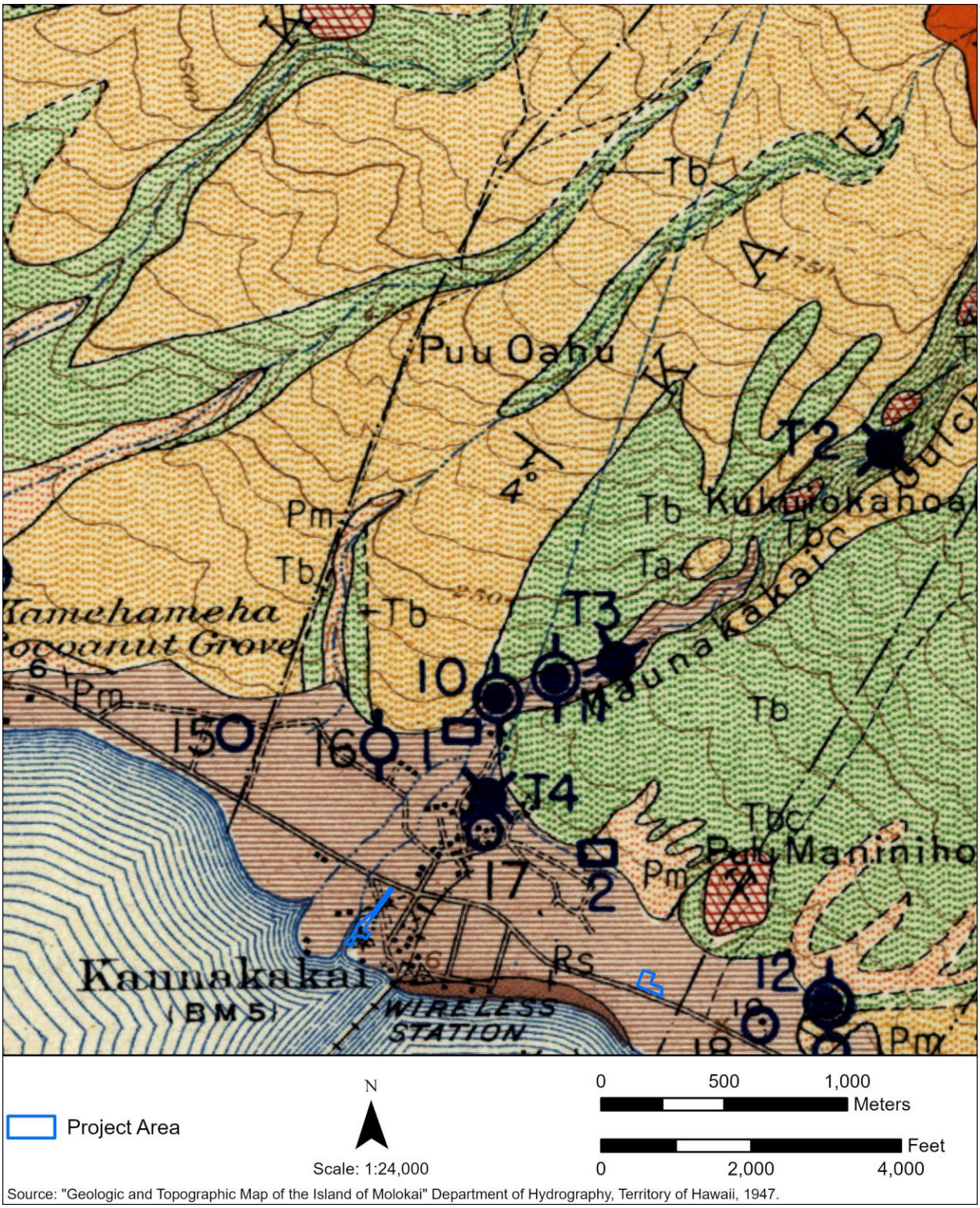


Figure 107. A 1947 topographic map showing Kaunakakai Town, with very little change from the 1924 map (see Figure 105).

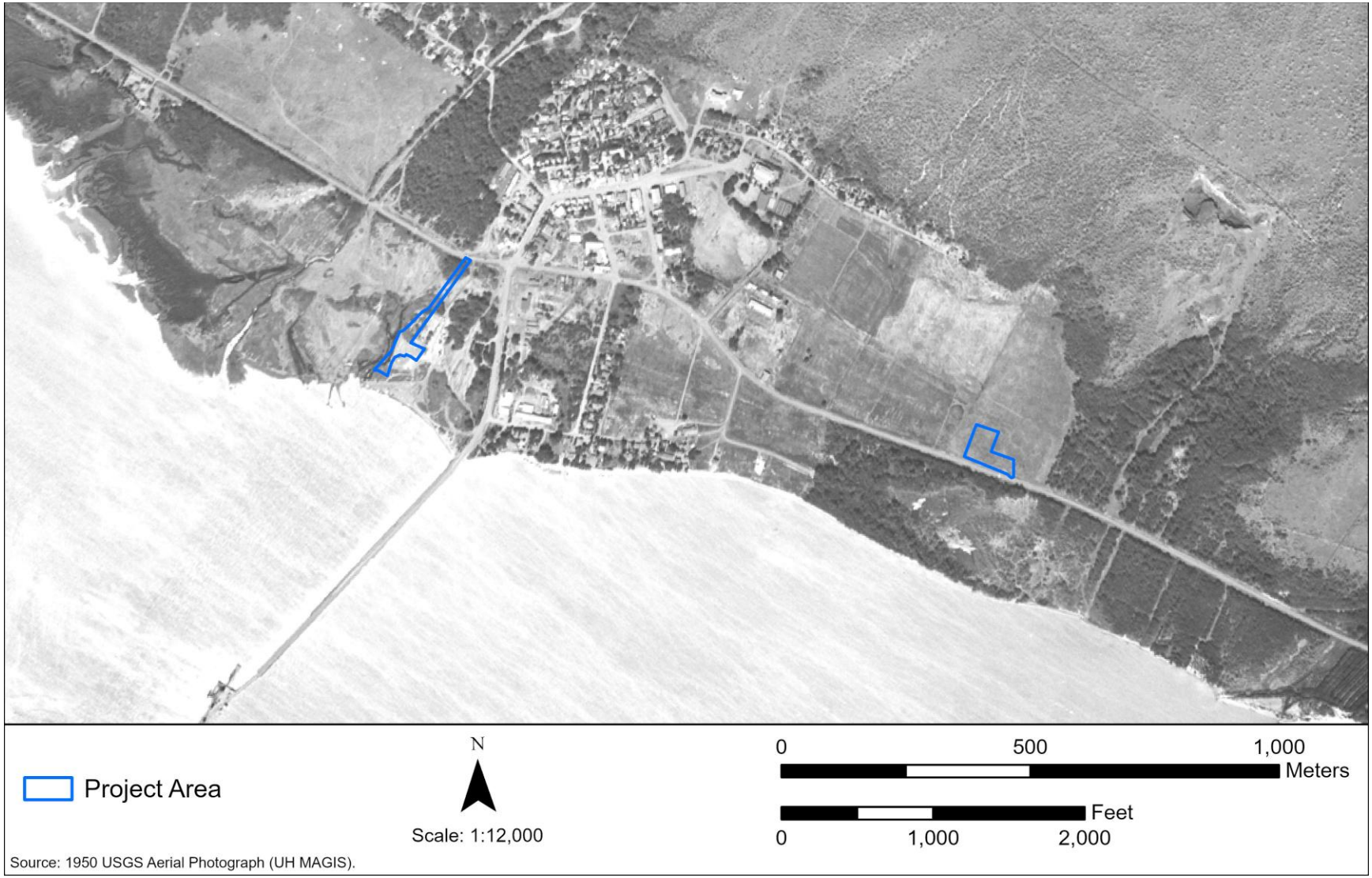


Figure 108. A 1950 aerial photograph showing the Molokai Yacht Club portion of the HIFL project area located within undeveloped land to the west of Kaunakakai Wharf and the Molokai Education Center portion of the HIFL project area within an open field.

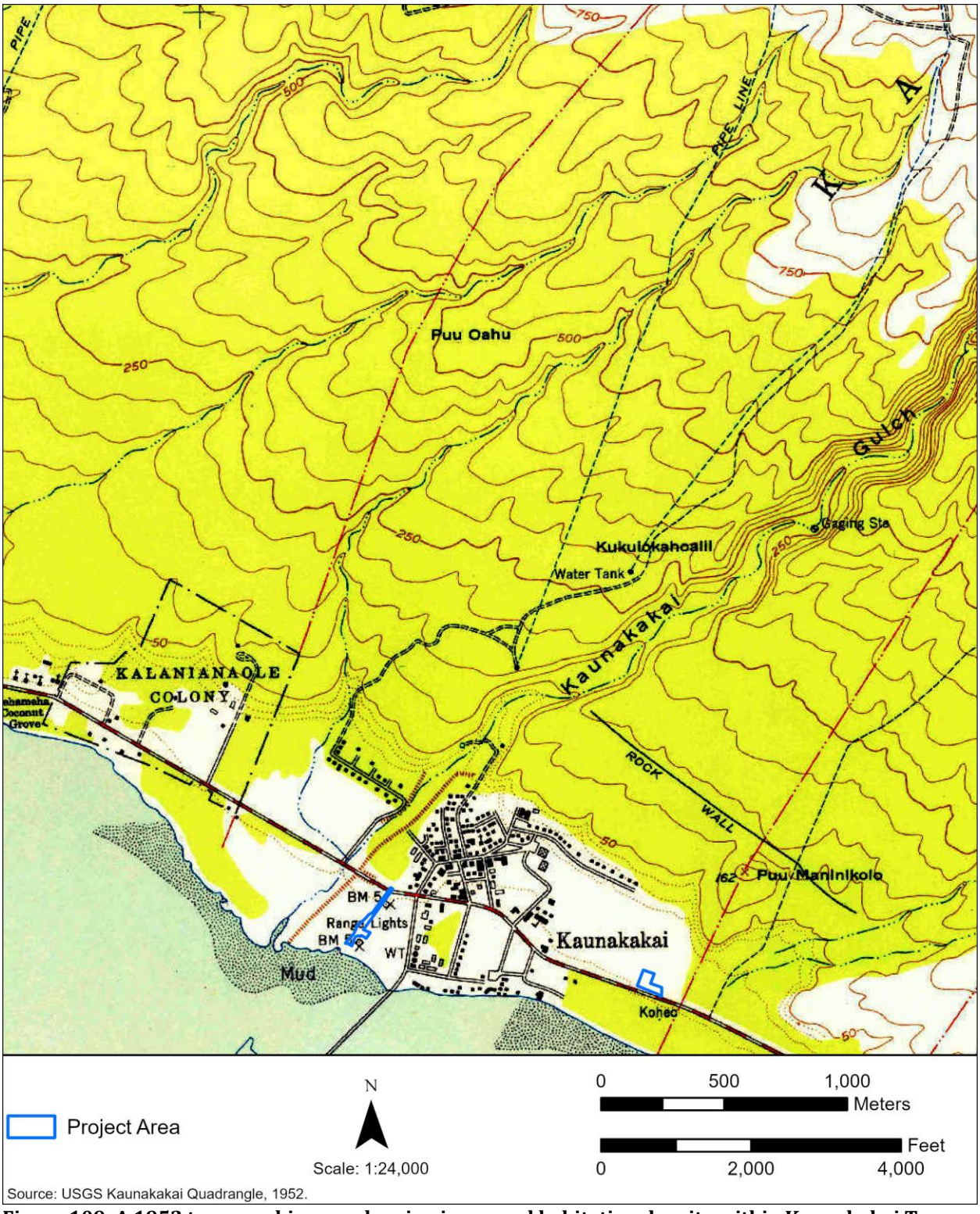


Figure 109. A 1952 topographic map showing increased habitation density within Kaunakakai Town.

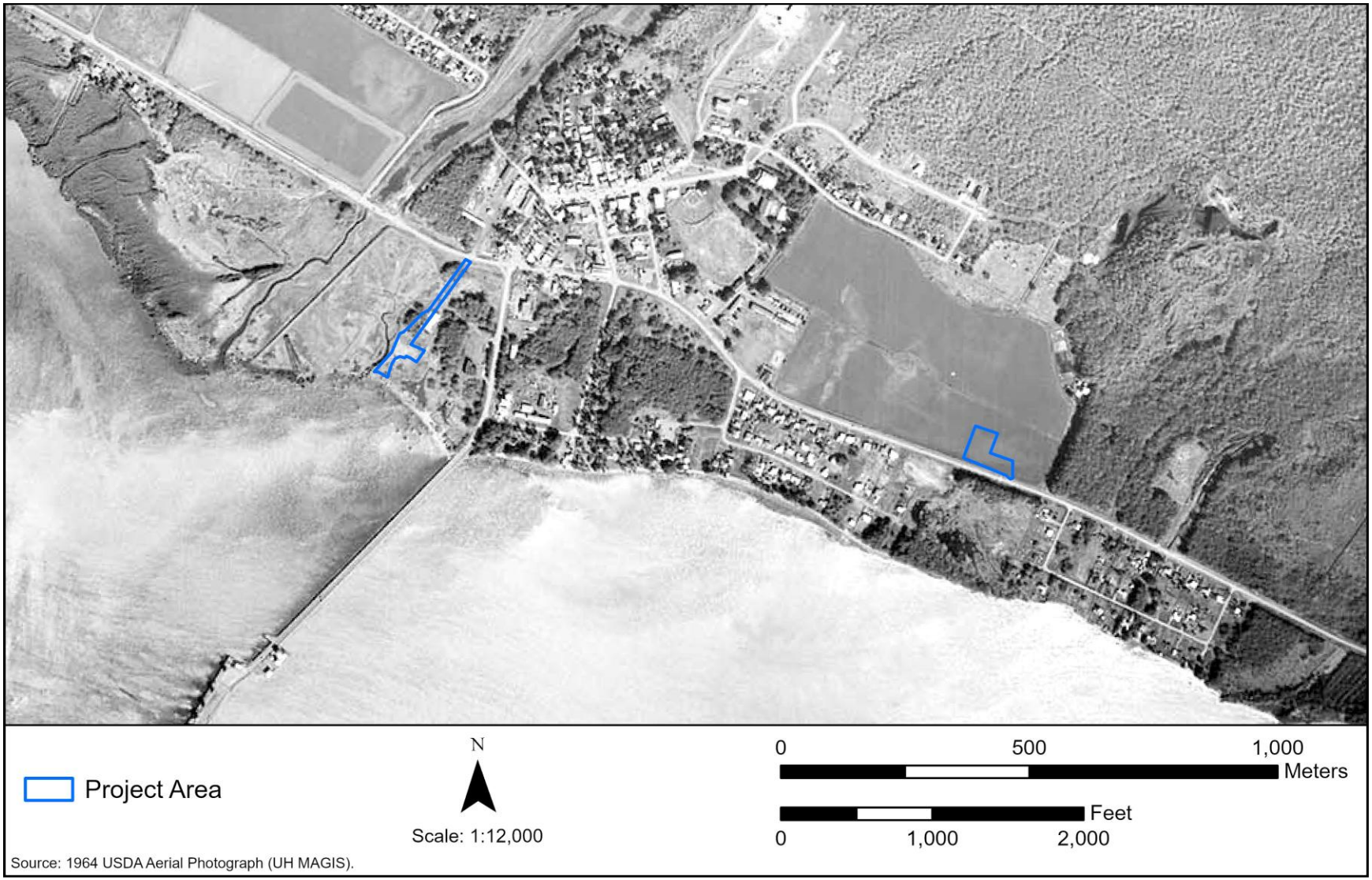


Figure 110. A 1964 aerial photograph showing slight growth of Kaunakakai Town but more marked increased habitation on the *makai* side of Kamehameha V Highway.

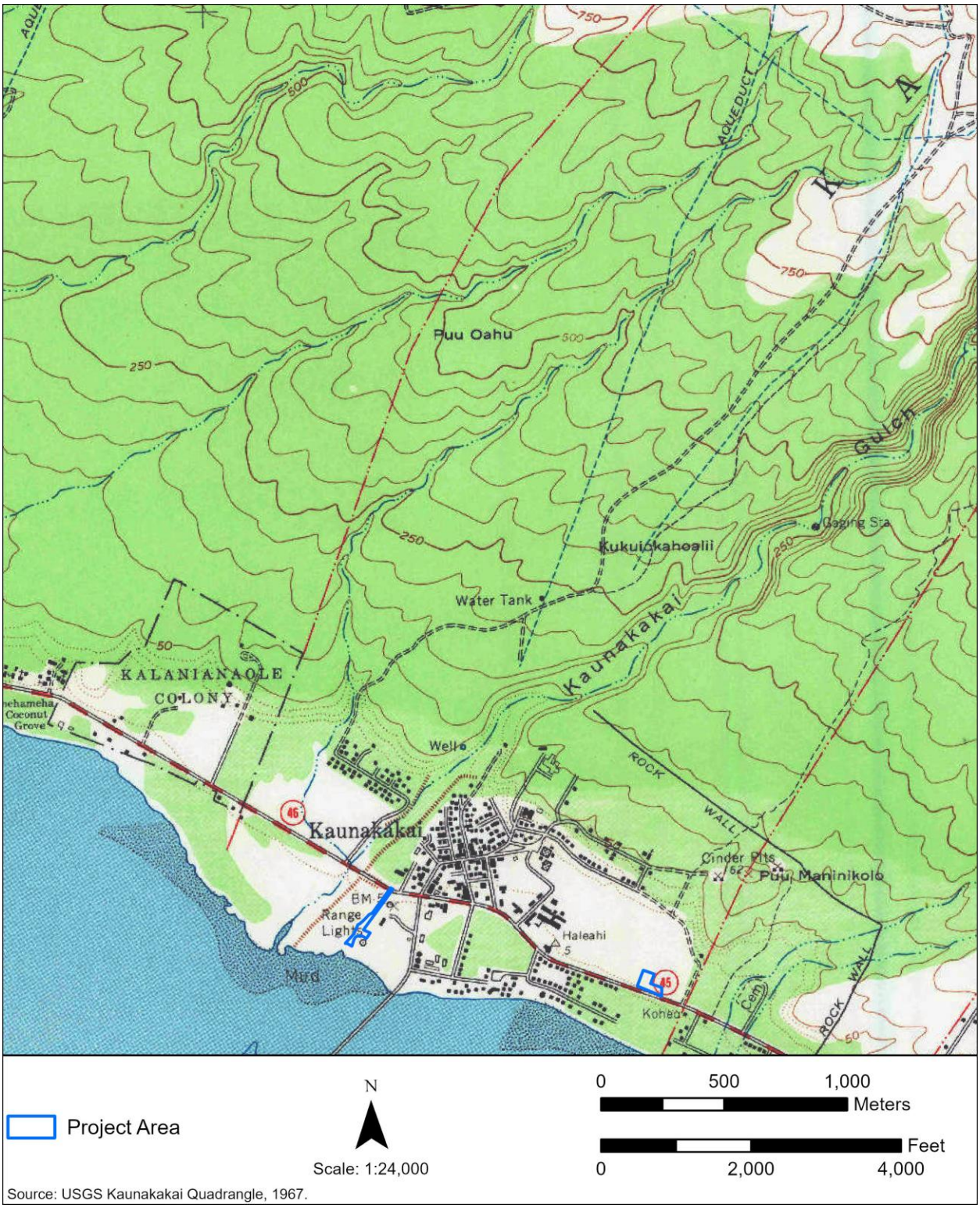


Figure 111. A 1967 topographic map showing the increased density of Kaunakakai Town.

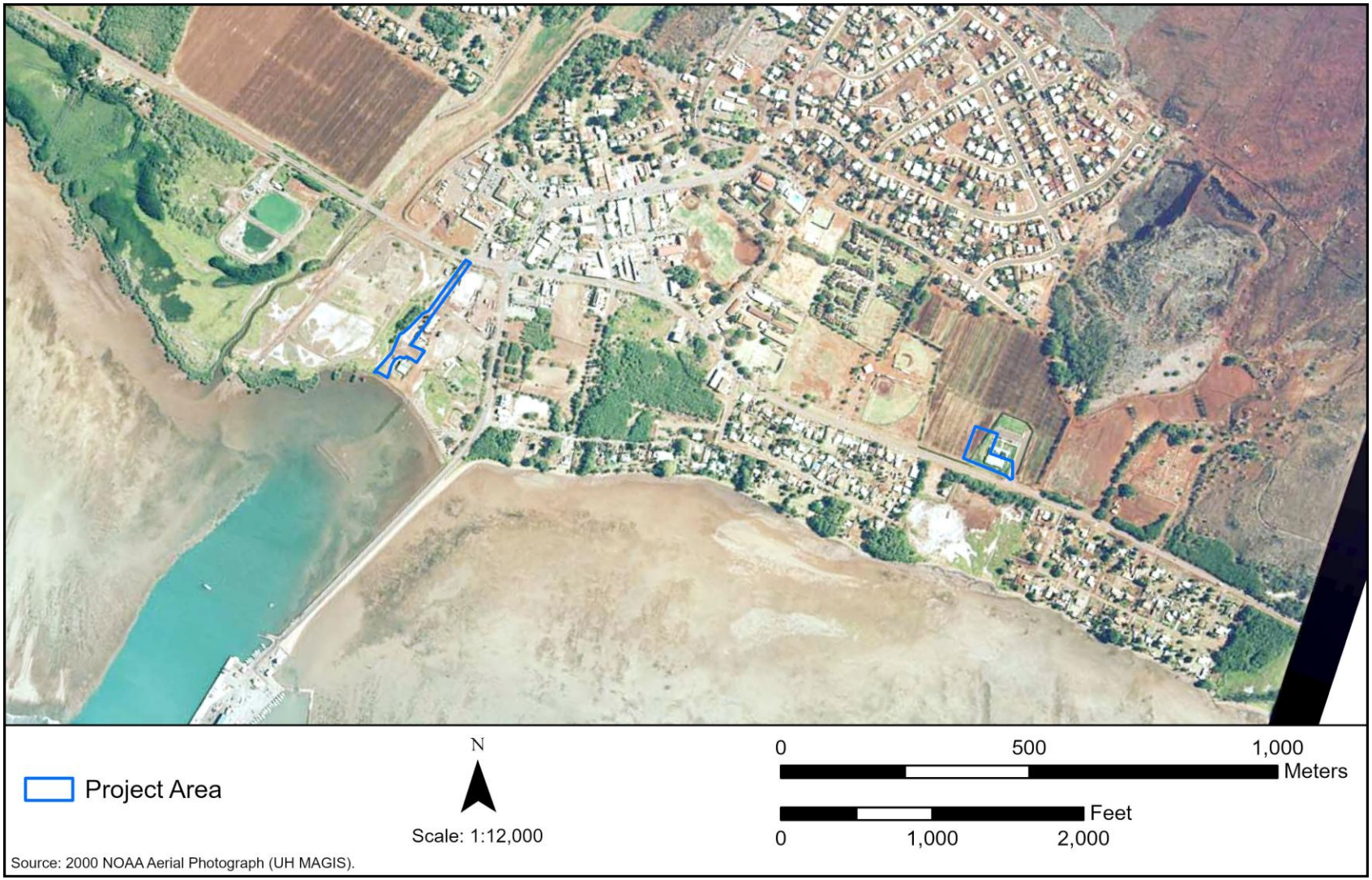


Figure 112. A 2000 aerial photograph showing the modern growth of Kaunakakai Town. The Molokai Education Center is now visible in the location of the Molokai Education Center portion of the HIFL project area, while the Molokai Yacht Club portion is adjacent to several small structures. The dredged break in the fringing reef at the location of Kaunakakai Wharf is clearly visible.

3.4.13 Previous Consultation for Nearby Projects in Kaunakakai Ahupuaʻa

The knowledge shared in previous CIAs for Kaunakakai Ahupuaʻa can provide further understanding of cultural practices and the exercising of Native Hawaiian rights in this area. Participants in the CIAs conducted by Faʻanunu et al. (2011) and Okuma (2016), which were for nearby projects, stressed the importance of Kaunakakai as a favored canoe landing place, thanks at least in part to the large natural channel through the fringing reef which provides access to a central location on Molokai, as well as the availability offshore freshwater springs. The wharf area was described as being home to a wide range of native and non-native nearshore species of fish, invertebrates, and *limu.* Noted cultural practices in the area included traditional fishing practices and collecting *limu*, both of which were cited as the means by which some participants maintained their livelihoods and subsistence.

During Faʻanunu et al.'s (2011) study, the lagoon and beach area were identified as a significant place for canoe paddling, and that no alternative sites for this cultural practice were available, due to Molokai's geography. In addition, Kaunakakai Wharf has been the dock site for *Hōkūleʻa*, and during its visits the area around the wharf is used for cultural and educational purposes. The area around Kaunakakai Wharf was also described as a site for fishing contests and games associated with the Makahiki. Other uses of the wharf area include swimming, exercise, sport fishing, a gathering place for community and social events, and an important space to connect with the ocean and the environment. Due to its central location, Kaunakakai has long served as a meeting place, for holding councils, for ruling *aliʻi*, and, more recently, for community members and cultural practitioners. Participants observed the presence of four major *heiau* (ʻŌpaeʻula, Puʻupāpaʻi, Kamalae, and Māhinahina), and that the wharf was built using stones from the *heiau* (Faʻanunu et al. 2011).

Okuma's (2016) study centered on the area within and surrounding Mālama Cultural Park, which is adjacent to the portion of the HIFL project area at the Molokai Yacht Club. CIA participants noted that prior to the introduction of ranching activities, there had been a fishing village near the wharf with fishing shacks that were later torn down by the ranch. Participants identified a platform in the area which was used by the Kamehamehas for their canoes, and sited Mālama Cultural Park as the area of King Kamehameha V's summer palace and Princess Ruth's summer home. One participant observed that part of the area was known for its salt beds during the late 1800s and early 1900s. When Dole Delmonte was active, homesteaders in the area leased their lands for pineapple agriculture, and the foundations of the scalehouse remain in Mālama Cultural Park.

Participants also emphasized the ranching and agricultural history of the area, observing that there used to be cattle and cornfields in the area, and that it was previously used by Molokai Ranch as a holding pen and processing area for livestock. A ranch survey identified the area as *akulele* (wetlands), and previous clearing and filling of this area by the ranch had impacted the wetland ecosystem. Ranching continues to be an important practice in the area: rodeo activities, including the Junior Roping Club and the Paʻu Parade Riders, still take place there annually (Okuma 2016).

In 2024, the Molokaʻi Climate Change and Sea Level Rise Adaptation and Resiliency (CCSLAR) Plan was developed. The plan included a map showing documented fishing sites around Kaunakakai Wharf (Matsuoka 1994, as cited by Sustʻāinable Molokai 2024:76) (Figure 113).



Figure 113. Locations of fishing sites recorded by Matsuoka 1994 in the vicinity of Kaunakakai Wharf (as cited in the Molokaʻi Climate Change and Sea Level Rise Adaptation and Resiliency (CCSLAR) Plan, 2024).

3.4.14 Previous Archaeology

A total of 33 archaeological studies have been conducted within a 0.5-mile (0.8-km) buffer around the Molokai portions of the HIFL project area. Table 14 provides an overview of all 33 archaeological investigations with a summary of their findings, and they are shown in Figure 114. The 19 previously identified historic properties within the 0.5-mile buffer are described in Table 15, which also contains significance assessments and mitigation recommendations. These historic properties are shown in Figure 115.

The historic properties identified in the vicinity of these portions of the project area reflect the continuous use of the south coastal flats of Kaunakakai during pre-Contact times for habitation, ceremonial practices, salt production, and agriculture. These sites included *heiau*, cultural deposits containing artifacts, midden, and charcoal, which yielded a calibrated radiocarbon date of AD 1230–1340 (Athens and Silva 1983), as well as a habitation complex and a possible burial. Post-Contact historic properties are largely associated with agricultural, industrial, and infrastructural activities and include walls and enclosures for animal husbandry, refuse pits, levees, the Molokai Public Library, and remnants of the wharf and railroad related to the American Sugar Company.

Two historic properties have been documented within the Molokai Yacht Club portion of the HIFL project area: SIHP 50-60-03-00630 (Athens and Silva 1983, Komori 1983) is a pre-Contact cultural deposit and 50-60-03-02573 (Lee-Greig et al. 2016) is a post-Contact cultural deposit consisting of a burn area with associated remnant building material, including glass, ceramic, and metal.

Komori (1983) provided the following description of SIHP -00630 (Bishop Museum Site Number 50-Mo-B1-6):

> No prehistoric or early historic surface features are present on the property. This may be the result of modern land alterations. It is possible, however, that intact cultural deposits exist below the surface. Near the western boundary of the property, an area of grayish coral sand apparently represents an exposed cultural deposit. Designated Site 50-Mo-B1-6,* this deposit covers an area of approximately 70 m^2 (700 ft^2) and extends into the adjoining parcel ... Cultural activity is indicated by the presence of prehistoric-type midden, including marine shells and fish bone, and numerous charcoal fragments. In addition, two prehistoric-type artifacts were recovered from the surface of the site, along with one artifact from the historic period: a basalt grinding or polishing stone (B1-6-1), a coral abrader (Bl-6-2), and a pearl-shell button, probably of local manufacture (B1-6-3). These artifacts have been deposited at the Bishop Museum.
>
> A screw-type auger (1-in. diameter) was used to probe the cultural deposit to a depth of 75 cm (30 in.) in four areas of the site ... Exposed cuts in the area were also examined, and an attempt was made to probe areas outside of the exposed deposit; however, the compacted surface was too hard for the auger to penetrate. (Komori 1983:7)

Komori (1983) recommendations consisted of:

> In view of (1) the presence of possibly intact subsurface deposits, and (2) the proximity of the former location of the residence compound of Kamehameha V, it is essential that further archaeological work and historic research be conducted prior to further alterations to the project area. The archaeological work should consist of the following tasks:

(1) Systematic test excavations at Site Mo-Bl-6 to determine the nature and extent of the deposit.
(2) Systematic test excavations in Area A.
(3) Trenching in the vicinity of the parking lot, to determine the presence or absence of cultural deposits, and to provide a stratigraphic control for the test excavations.
(4) Trenching across the property to determine the presence or absence of cultural deposits.

In view of the dense compacted nature of the surface, the recommended trenching would be best done with a backhoe; the test excavations would be done by hand using standard archaeological techniques.

Based on the results of the testing phase, recommendations will be made with respect to final deposition of the cultural resources on the property. The need for further archaeological work will be assessed at that time. (Komori 1983:8)

Athens and Silva (1983) also provided the following description of SIHP 50-60-03-00630:

B1-6 surface remains were found to occupy roughly the area indicated on Komori's (1983:3) site map, except that the site extended somewhat further to the east. This area corresponded to the remaining vegetated zone on the property, a factor suggestive of recent disturbance as a determinant of the distribution of surface remains. This notion was born out by the subsurface investigations Area A, which was only 10 m^2 could not be located despite the bare ground and compass and tape measurements. It is assumed that Area A may have been only an unrecognized eastern extension of the B1-6 site, or else the surface midden was so sparse as to be almost undetectable. In any case, this project's fieldwork demonstrated that the surface archaeological remains bear no relationship to subsurface remains, and that the latter, in some degree, cover much of the project area. The location of Area A, therefore, became inconsequential with the results of the subsurface findings. (Athens and Silva 1983:29)

A total of 12 features were identified in the excavation units ... Eight are hearths (including two possible hearths), two are post molds, one is a pit, and the last is a possible wall. (Athens and Silva 1983:56)

Athens and Silva's recommendations included the following:

1) The best location for the ice plant/cold storage facility would be on the eastern side of the parcel in the area.... This area includes the southeastern quadrant and roughly the eastern one-third of the parcel north of the southeastern quadrant. Archaeological deposits in these areas are either absent or highly disturbed. No further archaeological investigations need be undertaken in this area, except as concerns an archaeological monitor as indicated below. This area, it should be mentioned, contains the weigh station. However, there is no reason to insist on its preservation as it has now been both photographed and mapped.
2) Land alteration or construction of any type should not be permitted on the remaining western side of the parcel without prior archaeological salvage excavation. This part of the property has the densest archaeological remains from both the historic and prehistoric periods. The prehistoric deposits constitute a valuable resource for purposes of scientific research. Trench 6 is included in this area as it could contain important structural remains from the historic period. Further investigation will be needed to clarify the nature of the Tr-6 deposits.
3) Landscaping of the western side of the property is permissible as long as subsurface excavation is not required. The only exception is for the planting of occasional trees and bushes. Holes for these plants should not exceed 18 inches in depth.

> 4) Additional historical studies are not needed at this time.
> 5) An archaeological monitor, should be present for all subsurface construction work on the eastern side of the property. The developer must provide funds to the monitor for the processing and reporting upon and archaeological materials that may be disclosed during the course of construction activities. This would include charcoal samples for radiocarbon dating, midden samples, bone, or other materials and artifacts that may be recovered and deemed appropriate for further study and reporting. (Athens and Silva 1983:86-88)

Lee-Greig et al. (2016) provided the following description of SIHP 50-60-03-02573:

> SIHP 50-60-03-2573 (SIHP-2573) is a subsurface cultural deposit identified within Backhoe Trench 21 (BT-21) during the course of subsurface testing … the overall horizontal extent for which was determined through the excavation of two perpendicularly placed test trenches. SIHP-2573 covers an area measuring roughly 7.3 m north-south by 5.0 m east-west … and ranges thickness from 2 to 5 cm. Located below two fill layers, Strata Ia and Ib, the burn layer itself was documented within Stratum II/IIa, and overlies C-horizon sediment ... The heat of the burn event is indicated by the thermally altered characteristics of the contact between the burn layer and unaltered sediments of Stratum IIA at the northernmost extent where the clay of Stratum lib sediment has been hardened, or baked, by the heat.
>
> Cultural material collected from the burn layer consists of glass fragments, kukui nut fragments, shell fragments, a nail, as well as fragments of a stone fruit pit (see also Section 5.1 Artifact Analysis). Based on the cultural material content recovered from the burn layer, it is possible that the activities associated with this burn layer may be contemporaneous with the historic era activities that formed the cultural deposit (SIHP-630) identified by Komori (1983) and Athens (1983) in TMK (2) 5-3-01:2 on the southwest side of the Kaunakakai Place and Hio Place intersection (Lee-Greig et al. 2016:28).

Lee-Greig et al. (2016) assessed SIHP -02573 as significant under criterion d. Given the extensive documentation available for the site, the study concluded that there would be "no historic properties affected." However, due to the potential for encountering sensitive cultural remains within the project area, archaeological monitoring was recommended during all ground-disturbing activities (Lee-Greig et al. 2016:96).

During Pacific Legacy's field inspection, carried out as part of the LRFI for the HIFL Project, one potential historic property was identified within the Molokai Yacht Club portion of the project area, a debris pile containing concrete slabs with exposed rebar, scrap metal, and some cut tree trunks and other vegetation, indicating that this may be a very late post-Contact and/or recent deposit.

No historic properties were previously identified within the Molokai Education Center portion of the HIFL project area.

During Pacific Legacy's field inspection, carried out as part of the LRFI for the HIFL Project, no potential historic properties were identified at Molokai Education Center.

Table 14. Previously Identified Historic Properties within 0.5 Miles of the Molokai Portions of the HIFL Project Area

Reference	Type of Study	Findings
Stokes 1909	Archaeological Survey	Documented *heiau* and other significant structures in an unpublished, island-wide survey.
Summers 1971	Site Survey	Built on work by Stokes (1909) and others to build a comprehensive archaeological survey of Molokai Island. Identified four historic properties within 0.5 miles of the current project area: SIHP 50-60-03-00129, Kaunakakai Saltworks; 50-60-03-00130, Kamalae Heiau; 50-60-03-00131, Māhinahina Heiau; and 50-60-03-00132, Kahua Maika. No significance assessments or mitigation recommendation was made.
Davis 1977	Cultural Reconnaissance	Identified one historic property within 0.5 mile of current project area: SHIP 50-60-03-01600, a complex of seven agricultural features, including enclosures, platforms, a house site, a terrace, a mound, stone alignments, and a suspected post-Contact burial. The site was recommended for preservation, and no assessment of significance was made.
Shun 1982	Archaeological Investigation	Identified two historic properties within 0.5 miles of the current project area: Site 50-Mo-B1-5, later assigned SIHP 50-60-03-00631, a buried cultural layer dated to A.D. 1819±50, and post-Contact parallel mounds of unknown function (no SIHP number assigned). SIHP -00631 was assessed as significant (no significance criteria were provided) and recommended for mapping, controlled excavations, and monitoring. No significance assessment or recommendations were made for the parallel mounds.
Komori 1983	Archaeological Reconnaissance Survey	Identified one historic property within the current project area: Site 50-Mo-B1-6, later assigned SIHP 50-60-03-00630, a buried cultural layer containing marine midden, charcoal fragments, two pre-contact artifacts (basalt grinding stones and coral abrader), and a post-Contact pearl-shell button. The site was recommended for further archaeological work and historic research. No significance assessment was provided.
Athens and Silva 1983	Archaeological and Historical Investigation	Relocated one previously identified historic property, SIHP -00630 within the current project area. A total of 12 subsurface features consisting of eight hearths, two post molds, one pit, and a possible wall were identified. One hearth feature yielded a radiocarbon date of AD 1230–1340. The site was recommended for archaeological monitoring for all subsurface construction activities. No significance assessment was made.
Landrum 1984	Archaeological Reconnaissance Survey	Identified a cultural deposit: Site 50-Mo-B1-7, later assigned SIHP 50-60-03-00632, as well as two associated artifacts (an adze fragment and a discoidal vesicular basalt hammerstone), and two additional features (a mortar-and-stone foundation and a refuse pit; no SIHP number assigned). The site and features are located on the northwestern boundary of the current project area. The report recommended further archaeological investigation to determine the nature and extent of subsurface deposits throughout the project area. No assessment of significance was provided.

Reference	Type of Study	Findings
Kennedy 1988b	Archaeological Surface Survey and Subsurface Testing	No historic properties identified.
Weisler 1989	Archaeological Inventory Survey	Documented three previously identified historic properties, none of which were located within 0.5 miles of the current project area.
Tuggle 1993	Archaeological Excavations	Documented three historic properties: SIHP -00630, the previously identified cultural deposit; 50-60-03-00890, the "old pier", and 50-60-03-01030, : the Mālama Platform which was once the location for a summer house of Kamehameha V, a building for Kalaiakamanu Church, and Māhinahina Heiau. SIHP -00630 is located within the current project area and the other two are within the 0.5 mile buffer. This study focused on the excavation and documentation of SIHP -01030, which was assessed as significant (no criteria provided) and recommended for preservation and additional archaeological excavation. No assessment of significance and recommendations were provided for the other sites.
Borthwick and Hammatt 1994	Archaeological Inventory Survey	Identified two new historic properties within 0.5 miles of the current project area: SIHP 50-60-03-00895, a habitation enclosure with 3 features; and 50-60-03-00896 a post-contact boulder wall for animal husbandry. Both sites were interpreted as being post-Contact, assessed as significant under Criterion d, and recommended for data recovery. SIHP -00396 was also recommended for preservation "as is."
Heidel et al. 1998	Archaeological Data Recovery	Data recovery of two previously identified historic properties (SIHP -00895 and -00896) located within 0.5 miles of the current project area. SIHP -00895 was reinterpreted as a post-Contact work and storage area and SIHP -00896 was interpreted as a post-Contact wall built to keep out roaming cattle and delineate property boundaries. No significance assessments or mitigation recommendations were made.
Titchenal 1998	Archaeological Monitoring	Identified five features within 0.5 miles of the current project area. Fe. 1, 3, and 5 are post-Contact refuse deposits, Fe. 4 is a basal cobble pavement with associated post-Contact and midden material, and Fe. 5 is a pit-shaped disconformity suggested to be an extension of a post-Contact trash pit located nearby. These features were interpreted as relating to activities dating to the 1880s to 1920s, including the importation of fill materials by the Americal Sugar Company around 1897. No significance assessment was provided.
McGerty and Carson 1999	Archaeological Inventory Survey	Identified three additional features of a previously identified historic property, SIHP -00895, located within 0.5 miles of the current project area. Feature D is a paved terrace, Feature E is a small alignment of basalt stones, and Feature F consists of two adjoined small terraces. No further work was recommended, and no significance assessment was made.
McGuire and Hammatt 2000	Archaeological Monitoring	No historic properties identified.

Reference	Type of Study	Findings
Hammatt 2001	Archaeological Assessment	Assessed six sections of the 36-mile study route for potential to encounter subsurface historic properties and make recommendations for further archaeological work. Only Section 5 that extends from "Maunaloa Highway (460) along the Kamehameha Coconut Grove to Kaunakakai Place, then Kamehameha V Highway (450) from Kaunakakai Place to the west side of Kanoa Fishpond" is located within 0.5 miles of the current project area. Section 5 was assessed as having moderate probability for encountering archaeological resources and recommended for on-call monitoring. No assessment of significance was made.
Dye and Jourdane 2006a	Archaeological Assessment	No historic properties identified.
Dye and Jourdane 2006b	Archaeological Assessment	No historic properties identified.
McGerty and Spear 2006	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Muise and Rechtman 2008	Archaeological Monitoring	No historic properties identified.
Madeus and Hammatt 2010	Archaeological Monitoring	No historic properties identified.
Desilets 2011	Archaeological Monitoring	No historic properties identified.
McElroy et al. 2013	Archaeological Inventory Survey	No historic properties identified. An archaeological assessment report was submitted to SHPD.
Medrano and Dega 2013	Archaeological Monitoring	No historic properties identified.
Sprouse et al. 2013	Archaeological Monitoring	No historic properties identified.
McElroy and Elison 2014	Archaeological Monitoring	Identified two historic properties (SIHP 50-60-03-02514 and 50-60-03-02523) located within 0.5 miles of the current project area. These included two post-Contact walls: SIHP -02514 is potentially associated with early 20th century American Sugar Co. activities and SIHP -02523 likely served as structural support for the wharf dating to 1928. SIHP -02514 was removed to continue excavation, however remnants may still exist under Kaunakakai Place. SIHP -02523 was left in place and reburied. Both historic properties were assessed as significant under Criterion d and archaeological monitoring was recommended for any further ground disturbing work in their vicinity
Stine et al. 2014	Archaeological Monitoring	Identified one historic property (SIHP 50-60-03-02525) located within 0.5 miles of the current project area. This consists of a boulder fill for an 1898 American Sugar Co. railway. The historic property was assessed as significant under Criteria a and d, and an AIS was recommended prior to further ground disturbing activities in the vicinity of the historic property.

Reference	Type of Study	Findings
McElroy and Eminger 2015a	Archaeological Inventory Survey	Identified two historic properties (SIHP 50-60-03-00896 and 50-60-03-02563) located within 0.5 miles of the current project area. This included a post-Contact wall that may have functioned to keep cattle out of Kaunakakai Town and two parallel levees on the east and west banks of Kaunakakai Stream. Both sites were assessed as significant under Criterion d. SIHP -02563 was recommended for modification, reuse, and archaeological monitoring, while SIHP -00896 was recommended for avoidance and archaeological monitoring for future work in the vicinity.
McElroy and Eminger 2015b	Archaeological Monitoring	No historic properties identified.
Lee-Greig et al. 2016	Archaeological Inventory Survey	Identified one historic property (SIHP 50-60-03-02573) located within the current project area. SIHP -02573 is a subsurface cultural deposit consisting of a burn area and associated historic material. The site was assessed as significant under Criterion d and no further work was recommended. Archaeological monitoring was recommended for all ground disturbing work in the overall project area.
McIntosh et al. 2020	Archaeological Inventory Survey	Documented 18 pre- and post-Contact historic properties: 15 were newly identified historic properties and three were previously identified historic properties. None of these sites are located within 0.5 miles of the current project area.
Gross et al. 2022	Archaeological Monitoring	No historic properties identified.
Fechner et al. 2025	Archaeological Monitoring	No historic properties identified.

Note: Previous studies that include the current project area are highlighted in gray.

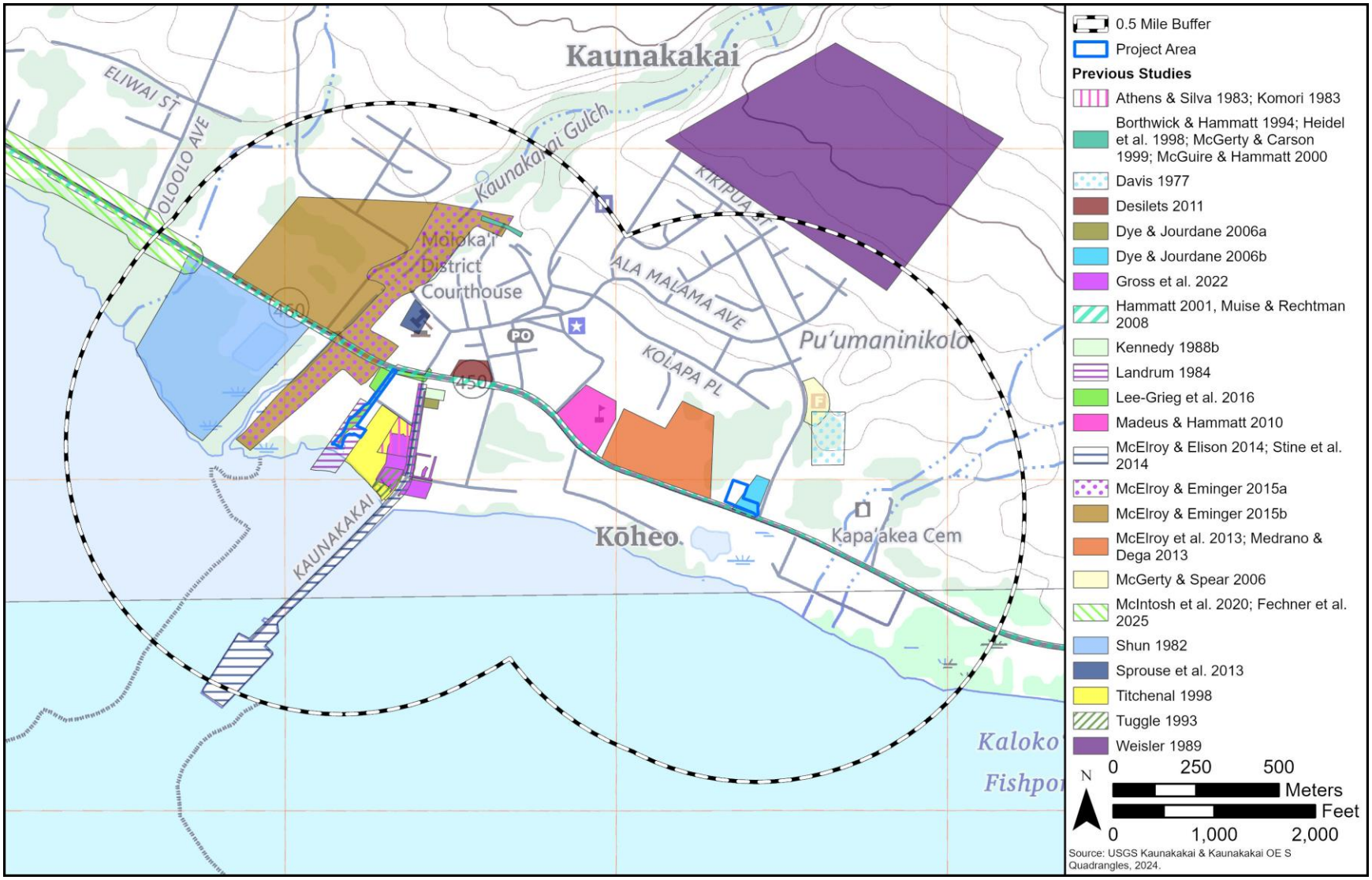


Figure 114. Previous archaeological studies within a 0.5-mile radius of the Molokai portions of the HIFL project area.

Table 15. Previously Identified Historic Properties within 0.5 Miles of the Molokai Portions of the HIFL Project Area

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-60-03-00129	Kaunakakai Salt Works	Salt production	Post-Contact	-	-	-	None provided	Summers 1971
50-60-03-00130	Kamalae Heiau	Ceremonial	Pre-Contact	-	-	-	None provided	Summers 1971
50-60-03-00131	Māhinahina Heiau	Ceremonial	Pre-Contact	-	-	-	None provided	Summers 1971
50-60-03-00132	Kahua Maika	Recreation	Pre-Contact	-	-	-	None provided	Summers 1971
50-60-03-00630	Cultural Deposit	Habitation	Pre-Contact	-	-	-	Data Recovery (Komori 1983, Titchenal 1998); Archaeological Monitoring (Athens and Silva 1983)	Komori 1983; Athens and Silva 1983; Titchenal 1998
50-60-03-00631	Cultural Deposit	Habitation	Pre- to early post-Contact	-	-	-	Data Recovery/ Monitoring	Shun 1982
50-60-03-00632	Cultural Deposit	Habitation	Pre-Contact	-	-	-	Data Recovery	Landrum 1984
50-60-03-00890	Wharf remnants (stone alignment)	Shipping	Post-Contact	-	-	-	Preservation	Tuggle 1993
50-60-03-00895	Enclosure	Activity area; storage	Post-Contact	-	d	-	Data Recovery (Borthwick and Hammatt 1994); No Further Work (McGerty and Carson 1999)	Borthwick and Hammatt 1994; Heidel et al. 1998; McGerty and Carson 1999
50-60-03-00896	Wall	Animal husbandry	Post-Contact	-	d	-	Preservation (Borthwick and Hammatt 1994); Avoidance (McElroy and Eminger 2015a)	Borthwick and Hammatt 1994; Heidel et al. 1998; McElroy and Eminger 2015a
50-60-03-01030	Mālama platform	Ceremonial	Pre-Contact	-	-	-	Preservation	Tuggle 1993
50-60-03-01037	Moloka'i Public Library	Education	1937	-	-	A, C	Preservation	Moy 1993

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-60-03-01600	Complex (enclosures platforms, terraces, mounds, alignments, trail)	Habitation; possible burial	Pre- and post-Contact	-	-	-	Preservation	Davis 1977
50-60-03-02514	Wall, potentially associated with American Sugar Co. activities	Agriculture	Possibly early 20th century	-	d	-	Archaeological Monitoring	McElroy and Elison 2014
50-60-03-02523	Wall, potentially associated with the wharf	Likely structural support	ca. 1928	-	d	-	Archaeological Monitoring	McElroy and Elison 2014
50-60-03-02525	Boulder fill, possibly for a railway built by American Sugar Co.	Structural	ca. 1898	-	a, d	-	Archaeological Inventory Survey	Stine et al. 2014
50-60-03-02563	Walls	Levees (Water Control)	1950s	-	d	-	Modification/ Reuse/ Archaeological Monitoring	McElroy and Eminger 2015a
50-60-03-02573	Cultural deposit (burn area with associated remnant building material, glass, ceramic, and metal)	Indeterminate	Post-Contact	-	d	-	No Further Work	Lee-Greig et al. 2016
No SIHP No.	Subsurface linear mounds located at the water table	Possible salt production	Post-Contact	-	-	-	No Further Work	Shun 1982

Note: Previous studies that include the current project area are highlighted in gray.

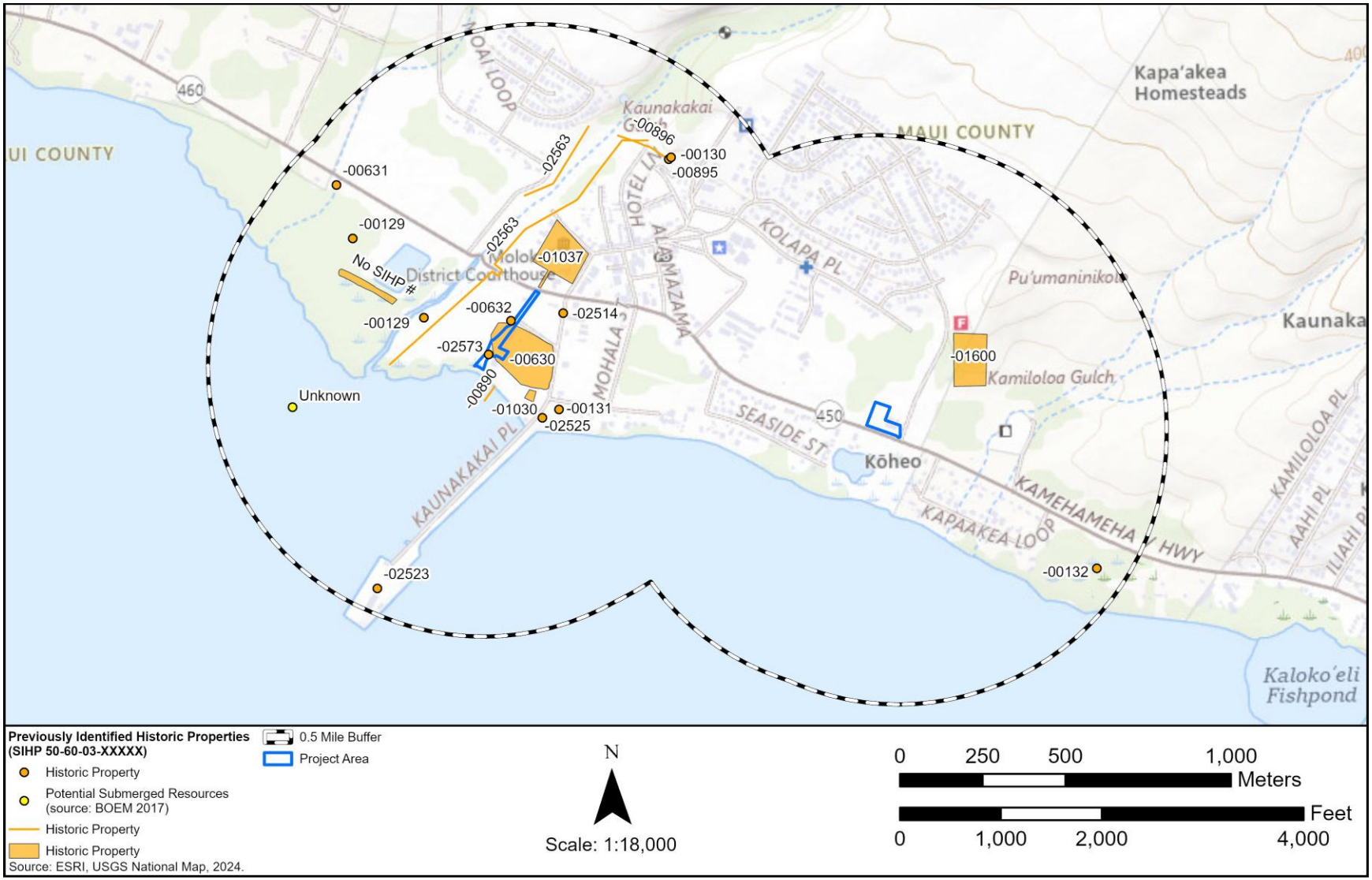


Figure 115. Previously identified historic properties within 0.5 miles of the Molokai portions of the HIFL project area.

3.4.15 Summary of Archival and Background Research for the Molokai Cable Landing Site

Kaunakakai Ahupuaʻa is centrally located in the Kona Moku of Molokai. Kaunakakai, formerly known as Kaunakahakai, which references the use of the harbor as a place for canoe landings and fishing. Kaunakakai was and is a central location on the island of Molokai. It features prominently in recorded oral traditions and tales of *aliʻi* vying for control of the Oʻahu, Maui, and Hawaiʻi Island chiefdoms throughout the pre-Contact and early post-Contact period of Hawaiian history.

Several *moʻolelo* relate to Molokai, and specifically, to the area of Kaunakakai. These include origin myths centered on Hina, who conceived Molokai, as well as *moʻolelo* that describe the interactions of legendary men who traveled to and from Molokai, including Kuʻula, who was a man who was believed to possess *mana kupua* and was able to command all the fish in the sea and had a son named ʻAiʻai who traveled around the islands and established *koʻa*. These *moʻolelo* speak to the centrality of fishing and traveling via canoe, and Kaunakakai serving as a key central place, not only for the south shore of Molokai, but of the entire archipelago.

The rich marine resources, which include good fishing areas and gathering places for resources such as *aloalo* (squilla, or mantis shrimp) in Kaunakakai and the southern coast of Molokai were likely one factor that led to this region being densely settled throughout the pre-Contact period. The relatively calm fringing reefs also provided ideal conditions for the development of aquaculture, with at least 58 *loko iʻa* (fishponds) being constructed along the leeward coast of the island. The rainfall in the upper valleys flowed down to the coast and enabled the development of intensified wetland agriculture, as well as dryland, rain-fed systems where *kalo*, *ʻuala,* and *pili* grass were grown in the *kula* lands of Kaunakakai.

During the Mahele, no LCAs were awarded in the *ahupuaʻa* of Kaunakakai. This area was owned by Kalani Pueo and subsequently passed to Abner Pākī, father of Bernice Pauahi Bishop. The entire *ahupuaʻa* was purchased by Kamehameha V, who built a large secluded estate, Mālama, near Kaunakakai Harbor. During a gathering at his compound during the 1860s, he met with a British count, who suggested building a large salt works nearby. Kahapaʻakai, the first large scale salt works on Molokai, was located in Kawela Ahupuaʻa to the east of Kaunakakai.

Following the death of Bernice Pauahi Bishop, Kaunakakai Ahupuaʻa was passed to the trustees of her estate, and in 1897, Molokai Ranch purchased the *ahupuaʻa* from the trustees. The ranch subsequently incorporated the American Sugar Company and developed the Kaunakakai Harbor and wharf area, installing a narrow-gauge railroad to facilitate the export of sugar and later, pineapple and cattle. Kaunakakai remained the island's main shipping port and vital to the island's economy throughout the mid-twentieth century, , and continues to be the main shipping port to the present day. Following the end of large-scale agriculture, Kaunakakai Town remained Molokai's major residential, commercial, and civic center.

The Molokai portions of the HIFL project area are within Kaunakakai Town, and previous archaeological studies have documented both pre- and post-Contact cultural deposits within the Molokai Yacht Club portion of the project area, which is near Māhinahina Heiau (SIHP 50-60-03-00131). Other nearby historic properties include pre-Contact subsurface cultural deposits, habitation complexes, and agricultural features. Post-Contact historic properties include Kamehameha V's Mālama compound (SIHP 50-60-03-01030), the Kaunakakai Salt Works (SIHP 50-60-03-00130), and features related to shipping and export of commercial agricultural products at the Kaunakakai Wharf, as well as the development of Kaunakakai Town.

3.5 LĀNAʻI CABLE LANDING SITE

Extensive background research and ethnographic documentation has previously been conducted for Mānele—and indeed for much of Lānaʻi Island—by Kepā Maly and colleagues (Dye et al. 2013, Maly 2013, Maly 2014). The background research presented in this report is largely a synthesis of the most relevant details from this previous body of work. The reader is especially referred to Maly (2013) for more detailed information about Mānele, and Pālāwai and Kamaʻo Ahupuaʻa.

The area known as Mānele lies at the south end of Lānaʻi, within the coastal portion of Pālāwai and adjacent to Kamaʻo Ahupuaʻa. Kamaʻo translates to "The *maʻo* [Hawaiian cotton; *Gossypium tomentosum*] plants" (Maly 2013:19). Its geography follows the 'typical' *mauka*-to-*makai* from the mountains to the sea) distribution. Pālāwai Ahupuaʻa is one of four *ahupuaʻa* (traditional land division) on Lānaʻi that crosses over the top of the island to contain portions of both the windward and the leeward side. According to Maly (2013:20-21), its name means "a fresh water moss (pond scum)," as water settling in the lowest part of Pālāwai Basin would pond up, causing moss or pond scum to grow. Soehren (1964) noted that the name "Mānele" previously applied only to the western portion of the bay front, although today, it refers to the entire bay area. The Lānaʻi portion of the HIFL project area is located entirely within the southern, coastal portion of Pālāwai Ahupuaʻa.

Mānele translates to "sedan chair," and may be named for the Chiefess Kaʻuaʻumokuokamānele, daughter of Governor Kuakini (Pukui et al. 1974:145). It is also said to be associated with passengers being carried up from their canoe landing to the dry shore (Maly 2020:1).

According to Pukui et al. (1974), Lānaʻi was also known as Nānaʻi. They cite an epithet, "Lānaʻi o Kaululāʻau," which translates literally to "day of conquest" (Pukui et al. 1974:128) and refers to the *moʻolelo* of Kaululāʻau. According to the multiple versions of the story presented by Maly (2013), Kaululāʻau was a Maui chief that traveled around the island in the early 1400s to rid it of evil ghost spirits and their ruler, Pahulu, to make the island safe for people to live.

Politically, Lānaʻi's history was closely tied to its close neighbors, Maui and Molokai. Throughout its history, Lānaʻi was independent at times, and at others, ruled by the leaders of Maui. Under the rule of the *aliʻi nui* (high chief) of Maui, Piʻilani, Lānaʻi was divided into 13 *ahupuaʻa*, which remain relevant land divisions today (Maly 2013).

3.5.1 Significant Place Names

A selection of place names associated with Pālāwai and Kamaʻo Ahupuaʻa are listed in Table 16 and depicted in Figure 116. Place names have been identified through Boundary Commission Testimonies, historic maps (Figure 117 through Figure 120), and information received from CIA participants. Literal translations of place names have been added when they could be found in Emory (1924), Pukui et al. (1974), or Pukui and Elbert (1986).

Maly (2013) provides translations for a type of *mele* (song) called *Uwe Helu* or *Kanikau*, which he describes as lamentation chants that recount the memories of loved ones. These *mele* were published in Hawaiian newspapers, and in addition to remembering cherished loved ones, they frequently also spoke to significant places, culturally valued resources, and traditional knowledge and practices. Two of these *kanikau* (laments) were published within months of each other, and were submitted by sisters who both lost their daughters at around the same time. The first was

written by Kahaolenui in March of 1878, in mourning of her daughter Kaumakaehukai who passed on in ʻEwa on October 28, 1877:

Kanikau la he aloha,	A lamentation of aloha,
Nou e Kamakaehukai,	For you Kaumakaehukai,
No Lanai ka wahine,	The woman was of Lanai,
No ke one i Manele,	From the sands at Manele,
No ke kai ne hala ole,	From the sea which murmurs with out accusation,
Ne hone i ke aumoe,	Murmuring in the late night,
Moe aku kuu i ka luhi,	Sleep and release the burden,
Moe aku a ala mai,	Sleep and awaken,
Pii aku o ke kula loa,	Ascend the long plain,
Pa pono ka la i ka umauma,	Where the sun touches the breast,
Hoomaha i Malauea,	Rest at Malauea,
Hopu i ka lau laau,	Gather the green growth,
I ka lau koaie,	The leaves of the koaie,
Papahi lei a ka wahine,	The garland that adorns the woman,
O ka pa kololio mai,	Where the kololio wind blows,
Ka makani lau aalii,	The wind that stirs the aalii leaves,
Uhi e kea o Naulu,	Covered by the naulu clouds,
Hala ia Kipona wela…	Where the intense heat passes by…

(*Mele* by Kahaolenui, *Ko Hawaii Pae Aina*, March 16, 1878. Translated by Kepā Maly, (Maly 2013:42-43).

The second, published on June 22, 1878, was written by J.H. Lululipolani to mourn the loss of her eldest daughter, Kahaukomo, who was born "on the sand of Manele," but taken to the leper colony in Kalawao where she passed in 1878. The *kanikau* identifies important places along the coast of Pālāwai and Kamaʻo:

…Kuu Kaikamahine mai	…My daughter
ka la wela o Manele,	from the hot sun of Manele,
Aloha ia wahi a kakou e noho ai,	Loved is that place where we lived,
E Hoomanawanui ai i ke kau	patiently through the season
o ka pilikia,	of trouble,
Hele mai ka pololi a nui,	The great hunger came,
He mea ole wale no ia ia kakou,	But it was nothing to us,
Aloha ke one aloha o Kaupakuea	Aloha to the glistening sands of Kaupakuea,
Aloha ke kawa lele o Lainohau	Aloha to you the diving spot of Lainohaunui,
Aloha Puupehe e au nei i ke kai,	Aloha to you Puʻupehe swimming in the sea,
Aloha ka nalu o Uolokeahi,	Aloha to you the surf of Uolokeahi,
Aloha ke one o Hulopoe,	Aloha to you o sands of Hulopoʻe,
Aloha ke kai o Kaluakoi…	Aloha to you the sea of Kaluakoʻi…

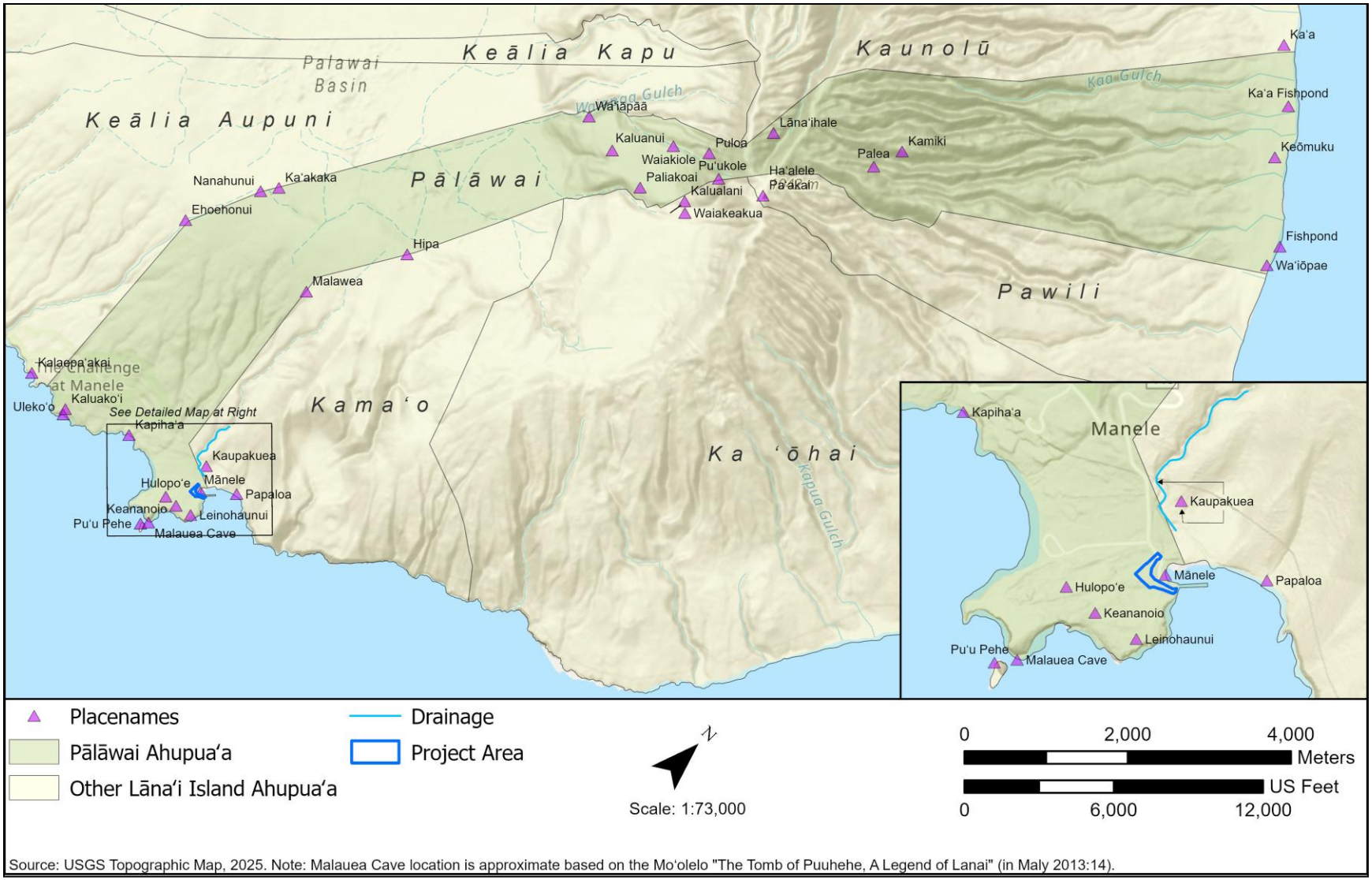
(*Mele* by J.H. Lululipolani of Mānele-Kaupakuea, Pālāwai. *Ko Hawaii Pae Aina*, June 22, 1878. Translated by Kepā Maly, (Maly 2013:43-45).

Table 16. Place Names within Pālāwai Ahupuaʻa

Place Name	Description/Significance	Source
Ehoehonui	Survey point, stone cairn boundary marker (Site 24a, Emory 1924:29).	Brown and Monsarrat 1878 (RM 1394)
Fishpond	Unnamed walled fishpond.	Brown and Monsarrat 1878 (RM 1394)
Haʻalele Paʻakai	Survey point, mountain summit; *lit.* "salt left" (Pukui et al. 1974:34) or "salt thrown away" (Site 250, Emory 1924:29). Emory (1924) provided a translation for the origin of this name: "I ka wa kahiko pii kanaka me ua haawe paakai aluna o ke kuahiwi i ke kakahiaka nui loa. Ike aku i ka paa mai o ka hau ilalo o Palawai, haalele i ka lakou paakai iluna iho. Manao ka lakou paakai ia hiki ilalo. Puka ka la pau ka hau. Hoaa lakou i ka paakai ole. Oia ka mea i kahea ia ai kela wahi o Haalelepaakai. In ancient times men climbed up the mountain early in the morning with their bags of salt. When they reached the top, they saw below the dew on Palawai Basin. They threw away their salt thinking that the whiteness below was salt, but when the sun came out the dew disappeared. Then they learned that it was not salt. That is the reason that the place is called 'Vanishing Salt'" (Emory 1924:20).	Brown and Monsarrat 1878 (RM 1394)
Hipa	Survey point; "*hipa"* translates literally to "imbecilic," (Pukui and Elbert 1986:72) though was also the name given to sheep, which were likely abundant during the time of Brown and Monsarrat's survey.	Brown and Monsarrat 1878 (RM 1394)
Hulopoʻe	Bay, beach, and surfing area; named for a man (Pukui et al. 1974:53), Hulopoʻe, who lived in the bay and had fishing rights for the section of beach (Sites 237 and 266, Emory 1924:30). Hulopoe (Hulopoʻe or Hulapoʻeo or Huelopoʻeo) describes the swirling motion of the sands on the beach (Maly 2013:19).	Harvey 1927
Kaʻa	Point; *lit.* "rolling" (Pukui et al. 1974:59) or "to roll" (Site 260, Emory 1924:30).	Brown and Monsarrat 1878 (RM 1394)
Kaʻa Fishpond	Walled fishpond.	Brown and Monsarrat 1878 (RM 1394); USGS 1923
Kaʻakaka	Plateau; *lit.* "the smashed jaw" (Site 245, Emory 1924:30).	(Harvey 1927)
Kalaepaʻakai	Point, land area; also shown as Laepaakai (Laepaʻakai) defined as "salt point," a land area that demarcates the *makai* boundary of Pālāwai and Keālia Aupuni Ahupuaʻa (Maly 2013:20).	Map of Pālāwai, no date or surveyor (RM 0506)
Kaluakoʻi	Bay and former village site; also known as Ulekoʻo; *lit.* "the adze pit" (Pukui et al. 1974:78-79, Site 235, Emory 1924:31, Maly 2013:19).	Harvey 1927
Kalualani	Survey point.	Harvey 1927
Kaluanui	Plateau land; *lit.* "the large depression" (Site 247, Emory 1924:31) or "the big pit" (Pukui et al. 1974:79).	Harvey 1927
Kamiki	Ridge (Site 254, Emory 1924:31); *lit.* "the activeness" (Pukui et al. 1974:81).	Harvey 1927

Place Name	Description/Significance	Source
Kapihaʻā	Bay; *lit.* "the driftwood" (Site 236, Emory 1924:32), translated by Maly (2013:19) as "the driftwood debris," the area where the sand ends and the rocks begin on Hulopoʻe Bay, "an important ancient village site." See also "Hulopoʻe" as cited by Pukui et al. 1974:53, Emory 1924:30, and Maly 2013:19.	Harvey 1927
Kaupakuea	Gulch and center of Mānele Bay; *lit.* "uplifted ridgepole" (Maly 2013:20). Beach; *lit.* "raised house ridge pole" (Site 52, Emory 1924:32). Village; interpreted as describing "the view of the thatched ridge poles of the village houses as they appeared to travelers on canoes in the ocean when they drew near the shore [at Kaupakuea village site]. At one time there was an extensive village here along the shore. The sheltered bay provided people with safe access to the ocean and rich fisheries, and along the shore there was fresh water in brackish seeps and in near shore wells. Around the house sites and in sheltered areas along Kaupakuea Gulch, terraces, walled enclosures and mulched pits supported cultivation of important food crops" (Maly 2014:114).	Brown and Monsarrat 1878 (RM 1394); map of Pālāwai, no date or surveyor (RM 0506)
Keananoio	Sea cavern, *lit.* "the tern cave" (Site 239, Emory 1924:32), a reference to the noddy tern (Maly 2013:20) or black noddy bird (*Anous minutus*), known as the *noio*.	Harvey 1927
Keōmuku	Village; *lit.* "the shortened sand (*ō* is short for *one*)" (Pukui et al. 1974:108) or "digging stick" (Site 257, Emory 1924:33); Emory (1924:33) also notes that if the word is "Keo-muku," rather than "Ke-o-muku," then the definition is "stretch of white." Pukui et al. (Pukui et al. 1974:108) write the name as "Ke-ō-muku." Maly (2013:14) refer to "Keomoku (Keomuku)" as a named place and ʻili in Pālāwai Ahupuaʻa.	Harvey 1927
Lānaʻihale	Highest peak on Lānaʻi, *lit.* "house [of] Lā-naʻi" (Pukui et al. 1974:128). Translated by Emory (1924:34) translated as "house hump," it is also associated with a spring named Nanaihale (Site 153, Emory 1924:34).	Harvey 1927
Leinohaunui	Sea bluff, pali; *lit.* "lei for Haunui (a person)" (Pukui et al. 1974:131) or "Jump of Haunui" (Site 240, Emory 1924:34), from the early 1900s to 1940s, a cattle chute located here (called the "Pipi" Chute at Mānele Landing, Maly 2014:116) was used to load livestock, supplies, and passengers on and off ships (Maly 2013:20).	Harvey 1927
Malauea Cave	Cave on the ocean; located below Puʻupehe, also known as Keanapuka, this cave is the one that Pehe was trapped in and killed by the ocean surge while she waited for Makaēhau (Maly 2013:13-16, 20).	Maly 2013:14
Malawea	Also known as Malauea; Maly (2013:20) identified two different places that bear this name: one is on the mid-elevation boundary between Pālāwai and Kamaʻo Ahupuaʻa, also identified by Emory (1924:34) as plateau land (Site 243); the other place is a cave on the ocean, located below Puʻupehe, also known as Keanapuka, this cave is the one that Pehe was trapped in and killed by the ocean surge while she waited for Makaēhau (Maly 2013:20).	Harvey 1927
Mānele	Harbor, bay, pre-Contact village site, burial area, and today home to the small boat harbor; *lit.* "sedan chair" (Pukui et al. 1974:145). The name is associated with the practice of carrying a visiting royalty's canoe from the water to the dry shore so that they would not get wet (Maly 2014:114). May also be named for Chiefess Kaʻuaʻumokuokamānele (Pukui et al. 1974:81, 145).	Brown and Monsarrat 1878 (RM 1394)

Place Name	Description/Significance	Source
Nanahunui	Plateau land; *lit.* "much charcoal" (Site 244, Emory 1924:35).	Harvey 1927
Palea	Ridge; translated as "to be blocked" (Site 253, Emory 1924:35). Pukui et al. (Pukui et al. 1974:176) translated Palea literally as "brushed aside," though in reference to a point associated with Hanauma Bay, Oʻahu.	Harvey 1927
Paliakoai	Ridge. Pali-a-koaʻe is described by Emory as the "cliffs of the tropic bird" (Site 108, Emory 1924:35), probably for the *koaʻe kea*, or white-tailed tropicbird (*Pahethon lepturus*). However, Harvey's (1903) map identified this place as Paliakoai. "Kōʻai" is defined as "to stir with a circular motion of the hand; to wind around, creep around, as a vine; to gird around…; to brace with a paddle" (Pukui and Elbert 1986:157).	Harvey 1903 (RM 2227)
Papaloa	A beach in Kamaʻo Ahupuaʻa that is associated with Mānele Bay; translated as "the long or distant flats" and identified as a sandy shoreline section and former village site by Maly (2013:21); translated as "very smooth" and identified as a beach used as a burial ground (Site 53, Emory 1924:35); *lit.* "long flat," though associated with an islet off Hāna, Maui and a coastal land section in Hālawa, Molokai (Pukui et al. 1974:180).	Soehren 1964
Puloa	Spring; *lit.* "covered out of sight," the place where Makakehau, lover of Puupehe was killed (Site 249, Emory 1924:36). Identified by Maly (Maly 2013:14) as a ravine where Makakehau and Puupehe caught *ʻiʻiwi* and scarlet *apapani* birds and also the rock spring where Makakehau saw the kona storm approaching which would fill the sea cave with water where Puupehe waited and kill her (Maly 2013:14-15).	Harvey 1927
Puʻu Pehe	Islet; *lit.* "Pehe's hill" (Pukui et al. 1974:205) or "owl-trap hill" (Site 238, Emory 1924:36); the place of a platform said to be where Makakēhau buried Puʻupehe after she drowned in the sea cave known as Malauea; often called "Sweetheart's Rock" in recent years (Maly 2013:13-16).	Brown and Monsarrat 1878 (RM 1394)
Puʻukole	Puʻu, point on main ridge; *lit.* "red or barren hill" (Site 111, Emory 1924:36) or "mons pubis," though in reference to places in Kohala, Hawaiʻi Island, Mauna Kea, Hawaiʻi Island, Kamalo, Molokai, and northeast Niʻihau (Pukui et al. 1974:200)	USGS 1923
Ulekoʻo	Alternate name for Kaluakoʻi.	Map of Pālāwai, no date or surveyor (RM 0506)
Waiakeakua	Spring inside a gulch that runs from Ka ʻŌhai to Pālāwai Ahupuaʻa (Maly 2014:141-142); *lit.* "water of the god" (Site 109, Emory 1924:37) or "water [used] by the gods" though in reference to a place in Mānoa, Oʻahu (Pukui et al. 1974:220).	USGS 1923
Waiakiole	Valley; *lit.* "rat water" (Site 248, Emory 1924:37).	Harvey 1927
Waʻiāpāā	Valley; *lit.* "held water" (Site 166, Emory 1924:37). Harvey (1927)noted the area "contains principle watering place."	Harvey 1927
Waʻiōpae	Valley mouth (Site 255, Emory 1924:37); translated by Thrum to mean "shrimp pulluting [sic] waters" (Emory 1924:37).	Brown and Monsarrat 1878 (RM 1394)



Source: USGS Topographic Map, 2025. Note: Malauea Cave location is approximate based on the Moʻolelo "The Tomb of Puuhehe, A Legend of Lanai" (in Maly 2013:14).

Figure 116. Traditional place names located in Pālāwai Ahupuaʻa.

3.5.2 Moʻolelo

Maly (2013:13-16) recounts a *moʻolelo* (oral tradition) related to Puʻupehe, a significant place located off the coastline of Pālāwai Ahupuaʻa (see Figure 116), and how it got its name. The story was published by Walter M. Gibson (1867), who claimed to have learned it from the chief Piʻianaiʻa. Versions of this story continued to be told in the early 1970s when Maly was conducting ethnographic research. According to the story, this place was known as *Kupapau o Puʻupehe* ("Tomb of Puʻupehe"), and at its summit was a small platform and low stone wall, where Puʻupehe, the daughter of Uaua, a petty chief of Maui, was buried by her lover, a warrior of Lānaʻi named Makakehau. Puʻupehe was so beautiful that Makakehau worried she would be coveted by the other chiefs. He hid her away in the cave of Malauea. They shared many joyous days together until one unfortunate day when Makakehau left Puʻupehe to fill water gourds at the mountain spring, and a Kona storm filled the cave with seawater and drowned Puʻupehe. After burying Puʻupehe at this legendary place, Makakehau leapt from the rock and was crushed in the breakers.

Gibson's version of the story was later published by Thrum (1907:181-186). Several passages in the tale provide insight into the surrounding area and the kinds of valued resources and cultural practices that were present. For example, when Makakehau tells Puʻupehe his plan to hide away with her, he says:

> Let us go to the clear waters of Kalulu. There we will fish together for the kala and the aku, and there I will spear the turtle. I will hide you, my beloved, forever in the cave of Malauea. Or, we will dwell together in the great ravine of Palawai, where we will eat the young of the uwau bird, and we will bake them in ki leaf with the sweet pala fern root. The ohelo berries of the mountains will refresh my love. We will drink of the cool waters of Maunalei. I will thatch a hut in the thicket of Kaohai for our resting-place, and we shall love on till the stars die. (Thrum 1907:182)

The story also tells of how they caught bright *ʻiʻiwi* birds (Scarlet honeycreeper; *Drepanis coccinea*) and *ʻapapane* (Hawaiian honeycreeper; *Himatione sanguinea*) in the Pulou Ravine, spent time in the banana groves of Waiakeakua, and how Puʻupehe would bake *honu* (Hawaiian green sea turtle; *Chelonia mydas*) in Malauea. Makakehau's lament for Puʻupehe also details their time together:

> Where are you O Puupehe?
> Are you in the cave of Malauea?
> Shall I bring you sweet water,
> The water of the mountain?
> Shall I bring the uwau,
> The pala, and the ohelo?
> Are you baking the honu
> And the red sweet hala?
> Shall I pound the kalo of Maui?
> Shall we dip in the gourd together?
> The bird and the fish are bitter,
> And the mountain water is sour.
> I shall drink it no more;
> I shall drink with Aipuhi,
> The great shark of Manele.
> (Thrum 1907:185)

When Puʻupehe died, she was wrapped in bright new *kapa* (barkcloth) and adorned in *naʻu* (gardenia; *Gardenia brighamii*) garlands. She would have been placed in the burial ground of Mānele if Makakehau had not intervened. Those who witnessed Makakehau's death "secured the mangled corpse and buried it with respect in the kupapau of Manele" (Thrum 1907:186).

Many of Gibson's contemporaries and later authors have remarked upon his florid writing (c.f., Adler and Kamins 1986, Emory 1924, Maly 2014). It is a caveat worth mentioning, as many *moʻolelo* and other accounts of Lānaʻi that were widely printed during the mid-nineteenth century had been authored, translated, or edited by Gibson. Most English-language accounts of the island's history are likely colored, to some degree, by his embellishments. Emory (1924) contrasted Gibson's account of Puʻupehe with what he described as an "unadorned story of a Lanai native of today":

> Ua make o Puupehe mamuli i kana kane hoihoi ia ana i loko o ke ana pili I ke kai. Hiki mai ka ino komo ke kai iloko o ke ana a make oia oiai nae kana kane ua pii i uka aku o na kahawai i wai no laua. Ike mai la nae ke kane i ka ino hoi koke mai oia. I ka hiki ana mai ua make ka wahine. Ia po iho i lawe malu ai oia i ka wahine a kau iluna o kela puu. O ke kumu, aole makemake o ka ohana o ke kana o kana wahine kela.
>
> The translation follows:
>
> In the sea cavern Puupehe was dead before her husband could reach her. A storm came up, the sea completely filled the cave and she died while her husband had gone upland to a stream to fetch water for the two. The husband saw very well that the storm was coming. He hurried back [but] when he reached [the cave] his wife was dead. That night he carried her off secretly and climbed on top of the island [to bury her]. His reason being that the family of the husband did not like his wife. (Emory 1924:16)

Another *moʻolelo* related to Puʻupehe is recounted by Fornander (1919). The story is only partially complete, and in fact, ends before Puʻupehe is born. However, Emory (1924)argues that it is very likely this story relates to the same Puʻupehe Island, as this Puʻupehe's parents, Kapoiliili and Kapokoholua, both share names that are related to places near Puʻupehe Island. In this story, Puʻupehe is an unborn child and speaks to Kapoiliili from the womb. A portion of this incomplete story talks about how Kapokoholua went out fishing at Mānele and caught the shark Puaiki, who brought him to Papawai on Maui, and then back to Mānele:

> When his father was fishing he became very much interested because he caught so many. When he glanced shoreward he could not see land, because Puupehe had covered it completely with fog. He thought to himself, "What can this wonderful thing be? There is now no wind to bring the fog on to the land!" He had a premonition, however, concerning his wife, so he commenced to pull in his line. When it was near the top his line was held by a shark. The name of this shark was Puaiki.
>
> Let me say a few words concerning this despicable fish. When he realized that it was a shark holding on he jerked the line; the fish took him to a point near the cape of Papawai here on Maui; from there he again came outside of Manele. He noticed that their house was surrounded by a many-colored cloud. When he arrived at his old fishing ground his line and hook were broken off. (Fornander 1919:556)

Puʻupehe stayed in his mother's womb for 13 months, but would periodically leave the womb and travel, especially when his parents were sleeping. During these travels, Puʻupehe observed a man preparing to fight with his parents:

> While they slept that night the child went to watch what one man was doing; he was teaching his pupils the art of casting the spear, and how to fly on to a water gourd, and so forth. He was teaching them with the idea that when proficient they were to fight with his parents, Kapokoholua and his wife. (Fornander 1919:558)

Puʻupehe entreated his father to pray for protection from Puaiki. However, the partial account ends before this matter is resolved (Fornander 1919).

3.5.3 ʻOlelo Noʻeau

A selection of *ʻōlelo noʻeau* pertinent to Pālāwai Ahupuaʻa are compiled here, along with their translations and interpretations from Pukui (1983). There is one *ʻōlelo noʻeau* which references Pālāwai specifically:

> 1564. Ka ua kapuaʻi kanaka o Pālāwai.
> *The rain of Pālāwai [which sounds like] human footsteps.*

Other *ʻōlelo noʻeau* make reference to Lānaʻi more generally, including several regarding Kaululaʻau, the Maui chief who traveled the island to rid it of evil ghost spirits and make Lānaʻi safe for people to live:

> 318. E Kaululāʻau, ʻakāhi no pō i pipili ai na maka.
> O Kaululāʻau, it is the first night that the eyelids have stuck so.
> Used in derision of one who doesn't use his eyes. Kaululāʻau was a Maui chief who, because of his mischief, was banished to the island of Lānaʻi by his father. There he destroyed the evil inhabitants of that island by applying gum to their eyelids after they had fallen asleep.

> 982. He weke, he iʻa pahulu.
> It is a weke, the fish that produces nightmares.
> The head of the *weke* fish is said to contain something that produces nightmares. The nearer to Lānaʻi the fish is caught, the worse the effects of the nightmares. Pahulu was the chief of evil beings (*akua*) who peopled the island of Lānaʻi. When Kaululaʻau, son of Kakaʻalaneo, ruler of Maui, was a boy, he was banished to Lānaʻi because of his mischief. By trickery, he rid the island of evil beings, and the spirit of Pahulu fled to the sea and entered a *weke* fish. From that time on, nightmares have been called *pahulu*, and a person who has had a nightmare is said to have been under the influence of Pahulu.

> 1943. Lānaʻi a Kaululāʻau.
> Lāna'i of Kaululāʻau.
> Said in admiration of Lānaʻi. Kaululāʻau was a Maui chief banished to Lānaʻi by his father for destroying his breadfruit grove. By trickery Kaululāʻau destroyed the island's evil spirits and became its ruler.

> 2103. Make auaneʻi i ka moana a pae kupapaʻu i Lānaʻi.
> May probably die at sea and his corpse wash ashore on Lānaʻi.
> Refers to a person on a very hazardous venture.

> 2315. Niniu Molokaʻi, poahi Lānaʻi.
> Molokaʻi revolves, Lanaʻi sways.
> A description of the revolving of the hips and the swaying movements in hula.



Figure 117. An 1878 map of Lānaʻi Island by J.F. Brown and M.D. Monsarrat. Note the expansive sands around Mānele, including within the Lānaʻi portion of the HIFL project area.

3.5.4 Settlement and Land Use

There were several sites of pre-Contact settlement in Pālāwai and Kamaʻo Ahupuaʻa, including a permanent village in Mānele. The sheltered bay of Mānele provided abundant marine resources and a launch for travels to and from Lānaʻi. The gulch of Kaupakuea is named for the thatched ridge poles of the once-plentiful house sites in area, and it also served as a boundary between Pālāwai Ahupuaʻa and the neighboring Kamaʻo Ahupuaʻa. All along the gulch were house sites, terraces, enclosures, and mulch pits which supported agricultural activities. Maly's (2014:117) field guide to Lānaʻi paints a picture of the pre-Contact Mānele Village Complex (also known as the Mānele-Kaupakuea Heritage Complex), with an open sandy beach and a variety of structures like *halau waʻa* (canoe sheds) and *lānai kaulaʻi ʻupena* (net-drying shelters) lining the shore, and the *kauhale* (homesteads) and *mahina ʻai* (dryland planting gardens) that structured daily life in the village extending back from the coastline.

Maly (2014) lists a number of plant species that were likely cultivated in the region: the traditional staple of *kalo* (taro; *Colocasia esculenta*), *ʻuala* (sweet potato; *Ipomoea batatas*) in the drier leeward areas, and numerous trees including *niu* (coconut; *Cocos nucifera*), *milo* (portia; *Thespesia populnea*), *noni* (*Morinda citrifolia*), *kou* (*Cordia subcordata*), *hala* (screwpine; *Pandanus tectorius*), and *wiliwili* (*Erythrina sandwicensis*). The tree species were planted in the gulch bottoms for protection, and to be watered by runoff and early morning dew.

These village sites were connected by a series of trails which ran across the shore and between the coast and uplands. According to Maly (2013), the road that leads from Mānele Harbor to the uplands of Pālāwai was adapted from this pre-Contact trail system. Maly's archival research indicates that by 1854, a public labor effort had completed many roads which connected to form a circuit around the island, many of these adapted from pre-Contact trails. This included the Pālāwai and Kaʻōhai roads, which were directly associated with the Mānele road (Maly 2013:92). More on the post-Contact developments of these roads is detailed later in this report.

The sand dunes extending behind Mānele have been found to contain *iwi kūpuna* (ancestral human remains) and are therefore culturally sensitive (Maly 2013:24). These dunes have also been home to the indigenous seabird *ʻuaʻu kani*, or the Hawaiian Wedge-tailed Shearwater (*Puffinus pacificus*), though their populations have declined in recent years (Maly 2014).

Maly (2013) notes that while there was limited freshwater available in this coastal region, stories from *kūpuna* (elders) of Lānaʻi described how it was possible to dive into the nearshore waters to fetch drinking water. A notable source of freshwater was in the area around Mānele's boat harbor:

> There are areas around the island where fresh water escapes from underground, through cracks in the rocks. When swimming in the ocean, you can feel a change in the water temperature, and it is in these places where the water becomes cold, that the fresh water is entering the sea. The kūpuna learned of these locations, and would dive into the water, carrying an empty ipu (gourd container). Once they were at the hole from which the fresh water was escaping, they would tilt the ipu, to allow it to fill up with the fresh water, and then return to the surface. This way they had access to drinking water year round, whether or not there were regular rains. One of the best known of these locations is situated in the water of Mānele-Kaupakuea, where the rocky coastline is situated, and just beyond the area of the present-day boat harbor. The people of old would frequently dive there with their gourds to capture fresh water for drinking. The kūpuna expressed this thought as "Life at Mānele was good, for there was water found, which was caught in the gourd." ("Maikaʻi

> Mānele i ka wai kaohi ipu.") (Hattie Holohua Kaenaokalani Kaopuiki (Tūtū Mama) and her husband, Reverend Daniel Kaopuiki Sr. ca. 1972, as quoted in (Maly 2013:22)

The platform on the small islet of Puʻupehe has been associated with the burial site of Puʻupehe (see Section 3.5.2), and also identified as a shrine dedicated to the god of bird catchers. Maly (2014) notes that small shrines, or *koʻa*, like this one were often built on islets like Puʻupehe, as these areas were frequent nesting grounds for seabirds, and prayers would be offered there to ensure large and healthy bird populations. Emory conducted excavations on Puʻupehe by removing "the two inches of soil which overlies bedrock" (Emory 1924:72). He did not encounter *iwi kūpuna*, but did find shells and bones of a number of terns.

Emory (1924) also identified what he described as a *koʻa* at Kaupakuea:

> Near Manele is a *koʻa* located at the foot of a ridge extending from Kaupakuea, about 35 feet from the sea. The shape of the platform is irregular, its sides measure 22 by 20 by 24 by 15 feet; its average height is 4 feet. At the back of platform are cowry shells, fish bones, crustacean remains, and bits of charcoal left from sacrifices. The cowry shells had not been broken to extract the meat. Most of the fish bones and crab shells are covered by a stone. (Emory 1924:40)

Pālāwai is also the name given to the collapsed caldera in the center of the island, which forms a basin covering roughly 3.5 square miles ('Pālāwai Basin') (Figure 121). The fertile soils of Pālāwai Basin made it a primary region for pre-Contact settlement and agriculture. The people of Pālāwai were known to have cultivated *ʻuala* (sweet potato; *Ipomoea batatas*), dryland taro, *kō* (sugarcane; *Saccharum officinarum*), *ipu* (gourds; *Lagenaria siceraria*), *maiʻa* (bananas; *Musa* sp.), and *wauke* (paper mulberry; *Broussonetia papyrifera*) in the basin and throughout the *ahupuaʻa* (Maly 2014).

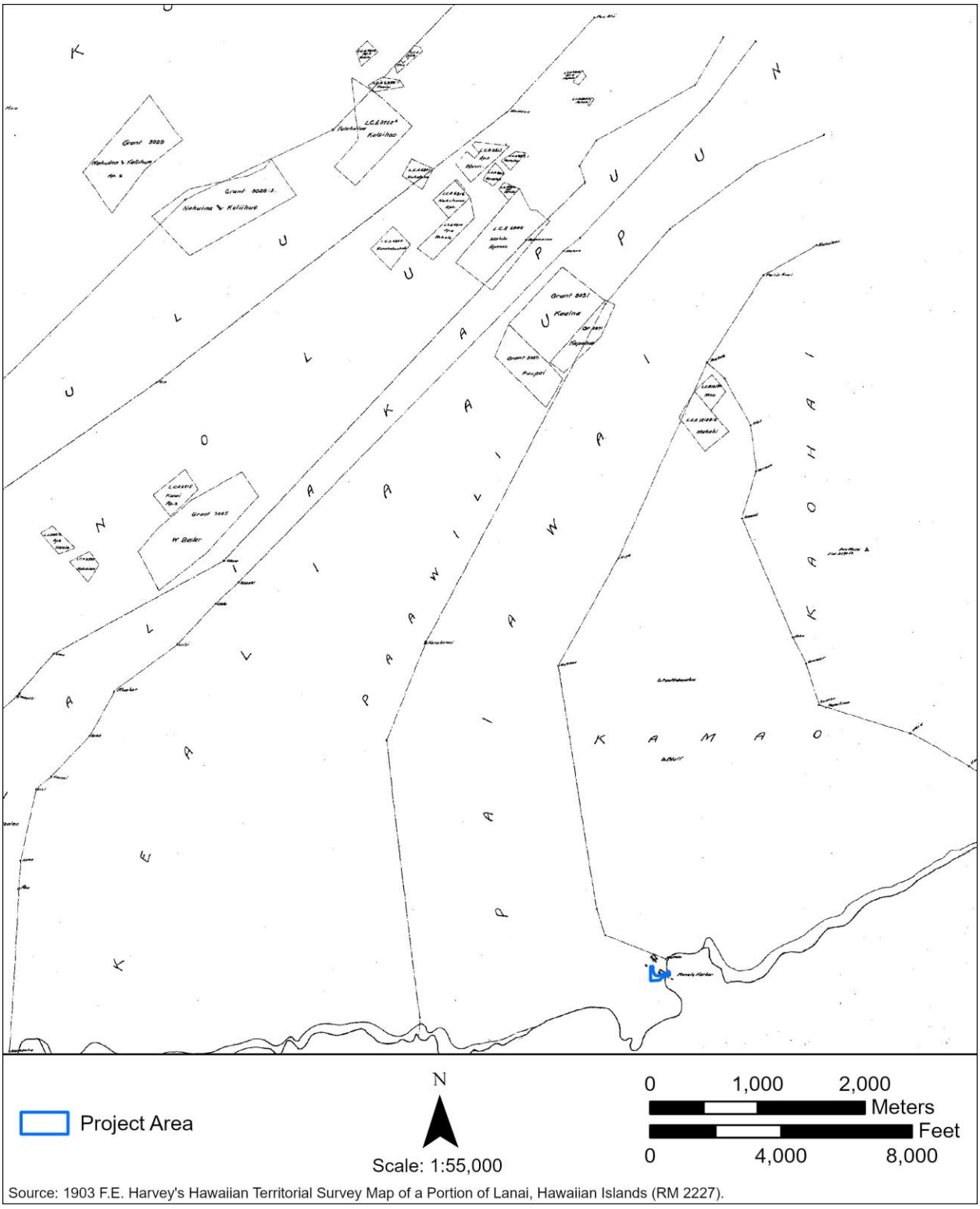


Figure 118. A portion of a 1903 Hawaiian Territorial Survey Map by F.E. Harvey with the Lānaʻi portion of the HIFL project area.

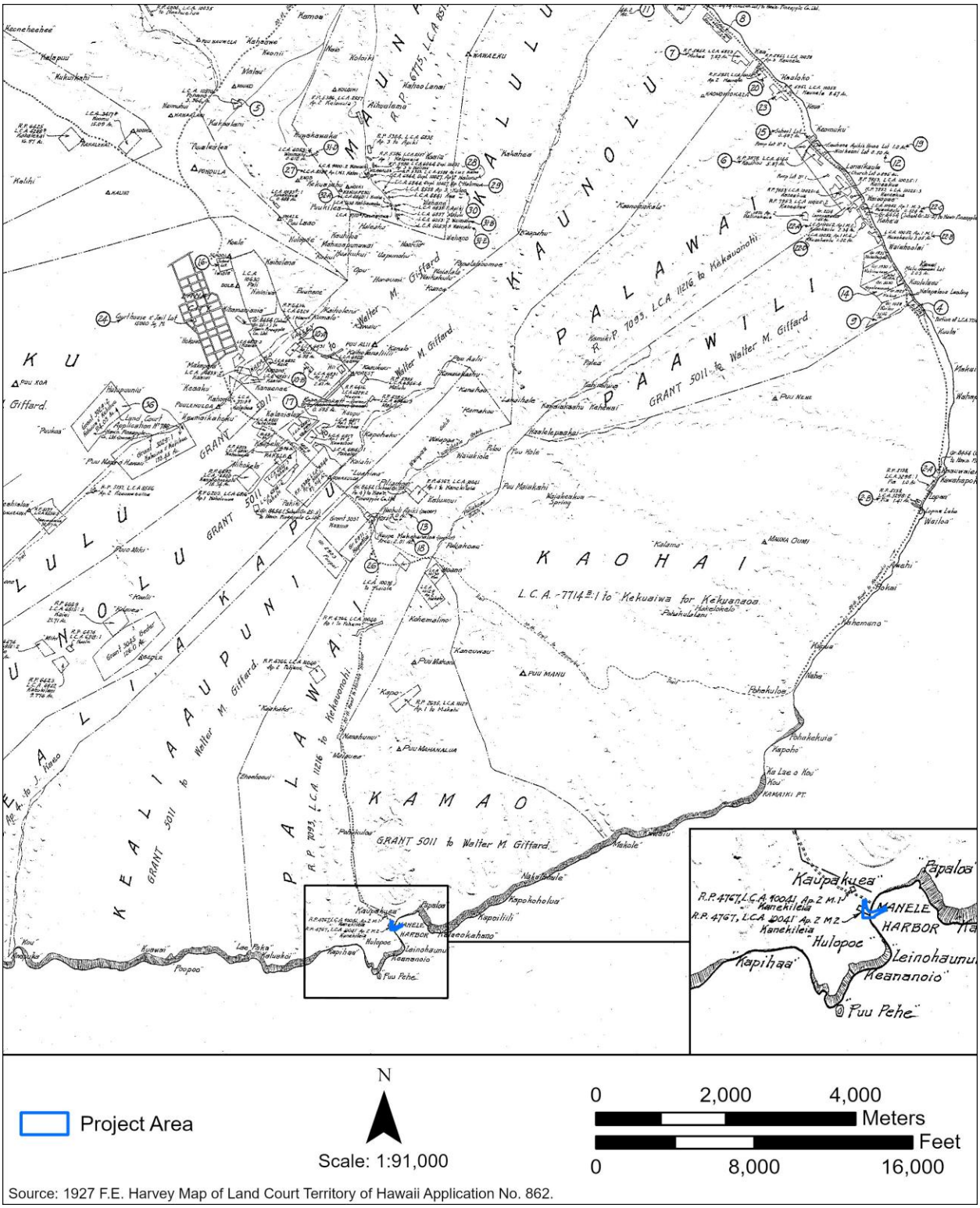


Figure 119. A 1927 map by F.E. Harvey is dense with significant place names and Land Commission Awards in Pālāwai and surrounding *ahupua'a*.

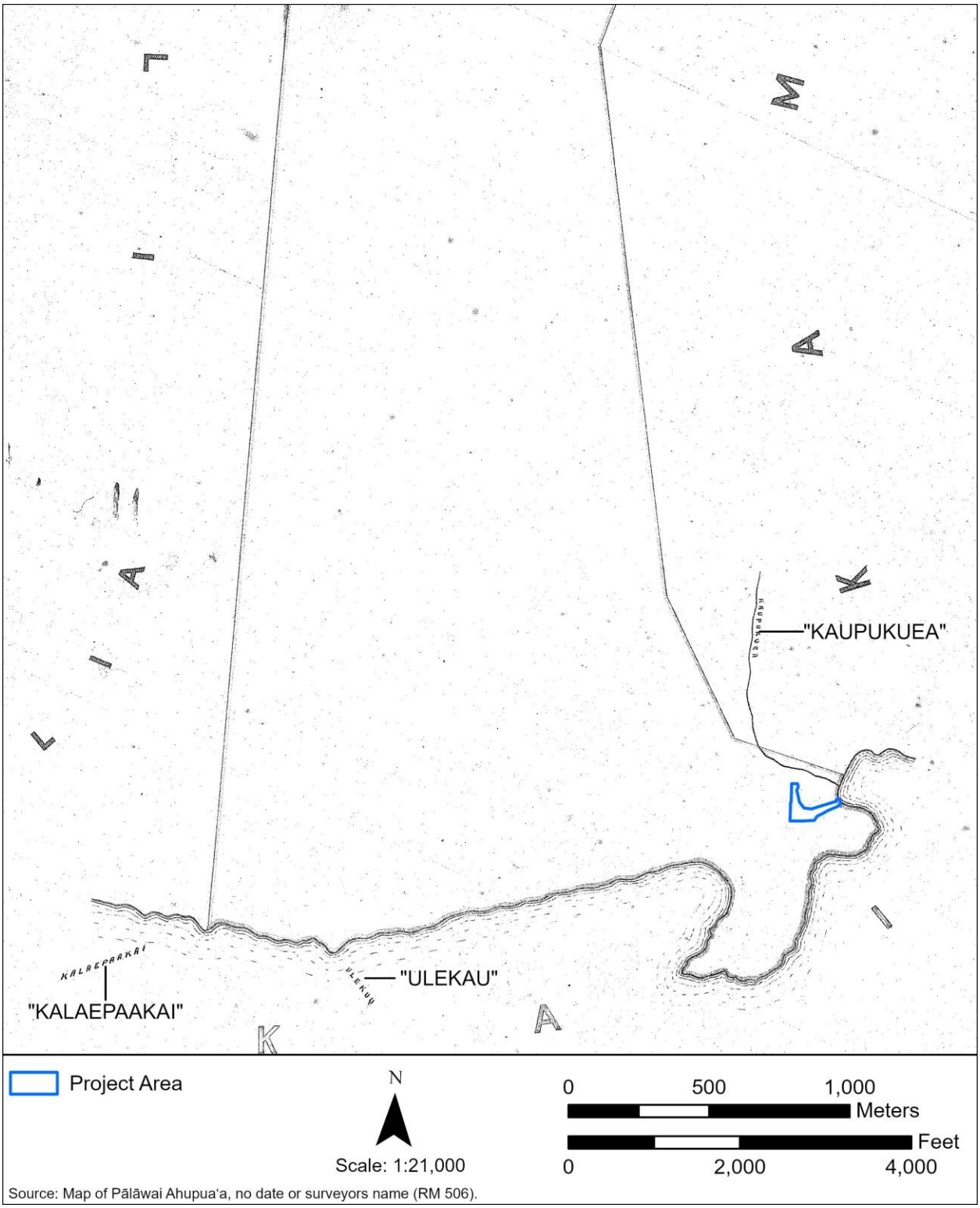


Figure 120. An undated map of Pālāwai Ahupuaʻa by an unknown surveyor. This map shows Kaupukuea [Kaupuakuea] as a line extending inland from Mānele Harbor.

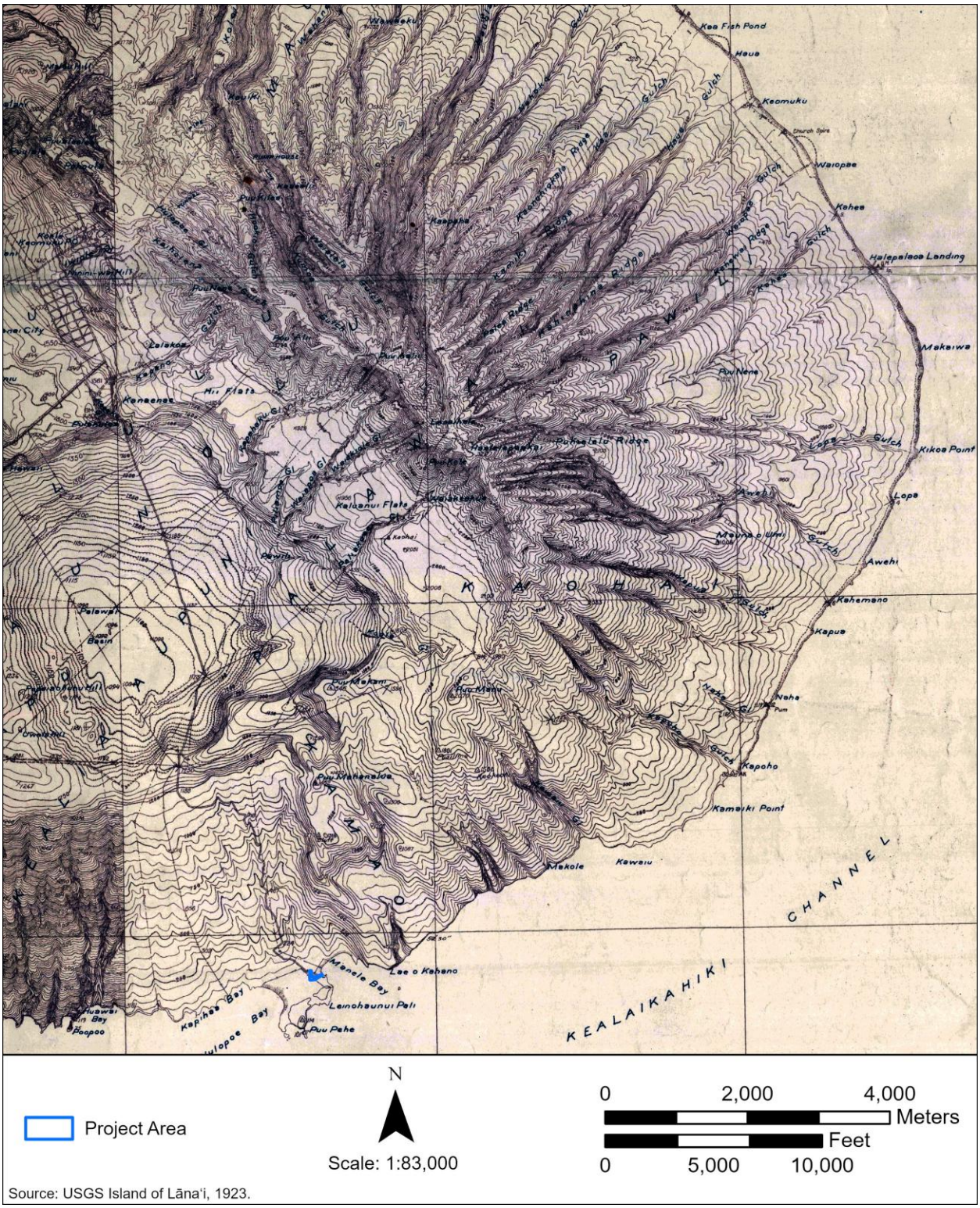


Figure 121. A 1923 USGS map with elevation gradients highlights the nearby gulches and steep ridgeline leading into Pālāwai Basin.

3.5.5 Post-Contact Transitions

A significant event in Lānaʻi's history occurred around the time of European contact, when the Kalaniʻōpuʻu, the *mōʻī* (sovereign) of Hawaiʻi Island, attempted to take the Maui group of islands. After his forces were repelled by forces on Maui, they settled on Lānaʻi for a time. While there, they wrought massive destruction on Lānaʻi, killing many of the residents and laying the land to waste. Kamakau (1961) relates how the chiefs and soldiers were slaughtered in their stronghold of Hoʻokiʻo, the water supplies were cut off, and the food ran out. People were driven to eat the *kupala* root (*Sicyos pachycarpus*), which loosened their bowels. Because of this, the war on Lānaʻi became known as '*Ka-moku-hi'*, or "the-land-of-loose-bowels" (Kamakau 1961:91). The war on Lānaʻi evidently started a trend in population decline that Lānaʻi was never able to recover from. Shortly after the devastation wrought by Kalaniʻōpuʻu and his warriors, the first major epidemic arrived on foreign ships in 1804. Maly (2013) tracks the population decline on Lānaʻi from 6,000 in 1793 to 2,000-3,000 in 1823, to just 200 people in the 1890s. By 1902, the native population had dropped to just 80 people.

Maly (2013) also notes two exceptional periods of population increase on Lānaʻi, both due to migrations of new populations to the island. The first occurred from 1854 to 1864, when the Mormon Church established an experimental station on Lānaʻi. Over 300 Hawaiians and a small number of non-Hawaiians moved to Lānaʻi during this time, with most living in the uplands of Pālāwai and traveling between this settlement and Mānele landing. The Mormon missionaries who arrived on Lānaʻi were the first long-term foreign residents to settle there. The second occurred from 1899-1901, when the Maunalei Sugar Company moved roughly 600 laborers to Lānaʻi to operate a sugar plantation in the windward section of Pālāwai.

Further impacts to Lānaʻi included significant post-Contact deforestation, caused by a number of compounding influences that included the introduction of nonnative terrestrial mammals, the *ʻiliahi* (sandalwood; *Santalum paniculatum*) trade, increased demand for staple crops, and new demands on firewood to process whale blubber. Deforestation had the further deleterious effect of reducing groundwater resources on the island, as Lānaʻi no longer had sufficient forest coverage to draw in moisture (Maly 2013).

Maly (2013) provides transliterated excerpts from the journal of William Richards, who wrote the earliest known post-Contact description of Lānaʻi in 1828, while visiting the island with Princess Nahiʻenaʻena, daughter of Kamehameha I. The excerpts speak to a visible scarcity of fresh water across the island, a strong reliance on coastal resources, and a more limited presence of agricultural activities inland:

> Most of the people live near the shore for the purpose of taking fish in which the shores of Lanai abound, and a considerable portion of their vegetable food they receive from Lahaina, in barter for fish. There is however one inland plantation of some extent, which furnishes considerable food. It is watered by the mist or light rain which falls during the night, in sufficient quantities for the growth of potatoes and in wet seasons some upland – taro is raised. There are few people that reside at that place constantly, but considerable number who reside generally on the shore, go up & spend a month or two at a time so as to keep their land under cultivation, and then return again to the sea side where they can have abundance of fish, and water too, such as it is for there is a plenty of that which is brackish. (William Richards 1834, as quoted in (Maly 2013:26)

3.5.6 The Mahele

Pālāwai Ahupuaʻa was awarded to Chiefess Kekauʻōnohi , a granddaughter of Kamehameha I, during the Mahele. Shortly thereafter, these lands were passed on to her husband, Levi Haʻalelea, upon her death in 1851. Maly (2013) describes the process during the Mahele through which kings and chiefs would file their claims for land as well as claim *konohiki* rights to certain fish and wood within those lands. These resources were restricted for the *konohiki* to provide for their sustenance and to generate revenue. In Pālāwai Ahupuaʻa, the *kapu* (taboo, sacred) fish was *ʻanae* (full grown mullet; *Mugil cephalus*), and wood was *ʻahakea* (*Bobea* sp.) (Letter from Noa Pali to the Minister of the Interior, August 26, 1852, as quoted in (Maly 2013:48).

Decades of research conducted by Kepā Maly on Lānaʻi have been compiled and made available to the public through the Lānaʻi Culture & Heritage Center's website (https://www.lanaichc.org/), including information on the history of land tenure from the Mahele to 1960. According to this research, 13 native tenants filed claims for *kuleana* lands in Pālāwai Ahupuaʻa. A single fee-simple *kuleana* grant was awarded in the coastal region of Pālāwai, situated near Mānele Harbor (Helu 10041, to Kanekeleia). This LCA claim was included in a larger group claim, which encompassed a number of petitioners across multiple *ahupuaʻa* of Lānaʻi (Helu 10024 through 10058). An excerpt of the group claim by Lono et al., as translated by Maly (2013) describes the use of these lands:

> Aloha to you Commissioners who Quiet Land Claims of the Hawaiian Kingdom. We hereby petition to enter our claims on the Island of Lanai.
>
> Here are our claims – moo (planting parcel) lands; kula (open plains and planting) lands; the mountains; the wood, woods to be taken under the Konohiki; fishes, fishes to be taken under the Konohiki; the length is from the moana (open ocean) to the fishery of Kaholo; from one fishery to the other fishery. We are the people in the Ahupuaa of Palawai, Pawili, Kaunolu, Kalulu, Maunalei, and Mahana. (Group Claim under Lono et al., Native Register 6:510-511, as translated by (Maly 2013:54)

Testimony by Kaliliaumoku in support of Kanekeleia's claim included information specific to his parcels of land:

> I know his Parcels of land at Palawai, Lanai. 2 Parcels of land in the ili below.
>
> Par. 1. 1 pauku (cultivated section) of uala, in the ili of Palawai.
> Par. 2. 1 Kahuahale (House site) and sweet potato garden in the ili of Manele.
> Par. 1. The boundaries are thus. Mauka, land of Konohiki. Kamaiki, land of Makahi. Makai, land of Kaiole. Kaena, land of Konohiki.
> Par. 2. The boundaries are thus, all about, land of Konohiki.
>
> He recieved [sic] these Pacels [sic] of land from his parents in the time of Kamehameha I, and resided there peaceably till his death in the yer [sic] 1848. He bequeathed these lands to Kauhi, his son, and he has held it since. No one has objected. (Native Testimony 13:279, as translated by Maly 2013:55)

Figure 122 and Table 17 present the LCAs and land grants awarded in Pālāwai Ahupuaʻa. Most of the awards in Pālāwai Ahupuaʻa were included in the group claim submitted by Lono et al. (Native Register 6:510-511, as translated by (Maly 2013:54).

Table 17. Land Claim Awards associated with Pālāwai Ahupuaʻa

Helu/Claim No.	Claimant	Description/Source
LCA 4145	Kauihau	Residence in the region of Keomoku (Native Register Volume 6:152, as translated by Maly 2013)
LCA 4767-1	Kamekileia	No translation available
LCA 10025-1	Kaneakua	Included in group claim under Lono et al. (Maly 2013)
LCA 10025-2	Kaneakua	Included in group claim under Lono et al. (Maly 2013)
LCA 10025-3	Kaneakua	Included in group claim under Lono et al. (Maly 2013)
LCA 10025-4	Kaneakua	Included in group claim under Lono et al. (Maly 2013)
LCA 10038	Kaiole	Included in group claim under Lono et al. (Maly 2013)
LCA 10040-1	Pohano	Included in group claim under Lono et al. (Maly 2013)
LCA 10040-2	Pohano	Included in group claim under Lono et al. (Maly 2013)
LCA 10041-2 M.1	Kanekileia	Included in group claim under Lono et al. (Maly 2013)
LCA 10041-2 M.2	Kanekileia	Included in group claim under Lono et al. (Maly 2013)
LCA 10058-1	Kaunele	Included in group claim under Lono et al. (Maly 2013)
LCA 10058-2	Kaunele	Included in group claim under Lono et al. (Maly 2013)
LCA 10058-3	Kaunele	Included in group claim under Lono et al. (Maly 2013)
Gr 1930-2	Nalimakana	A portion of 31.96 acres granted in 1855 (Office of Hawaiian Affairs 2025)

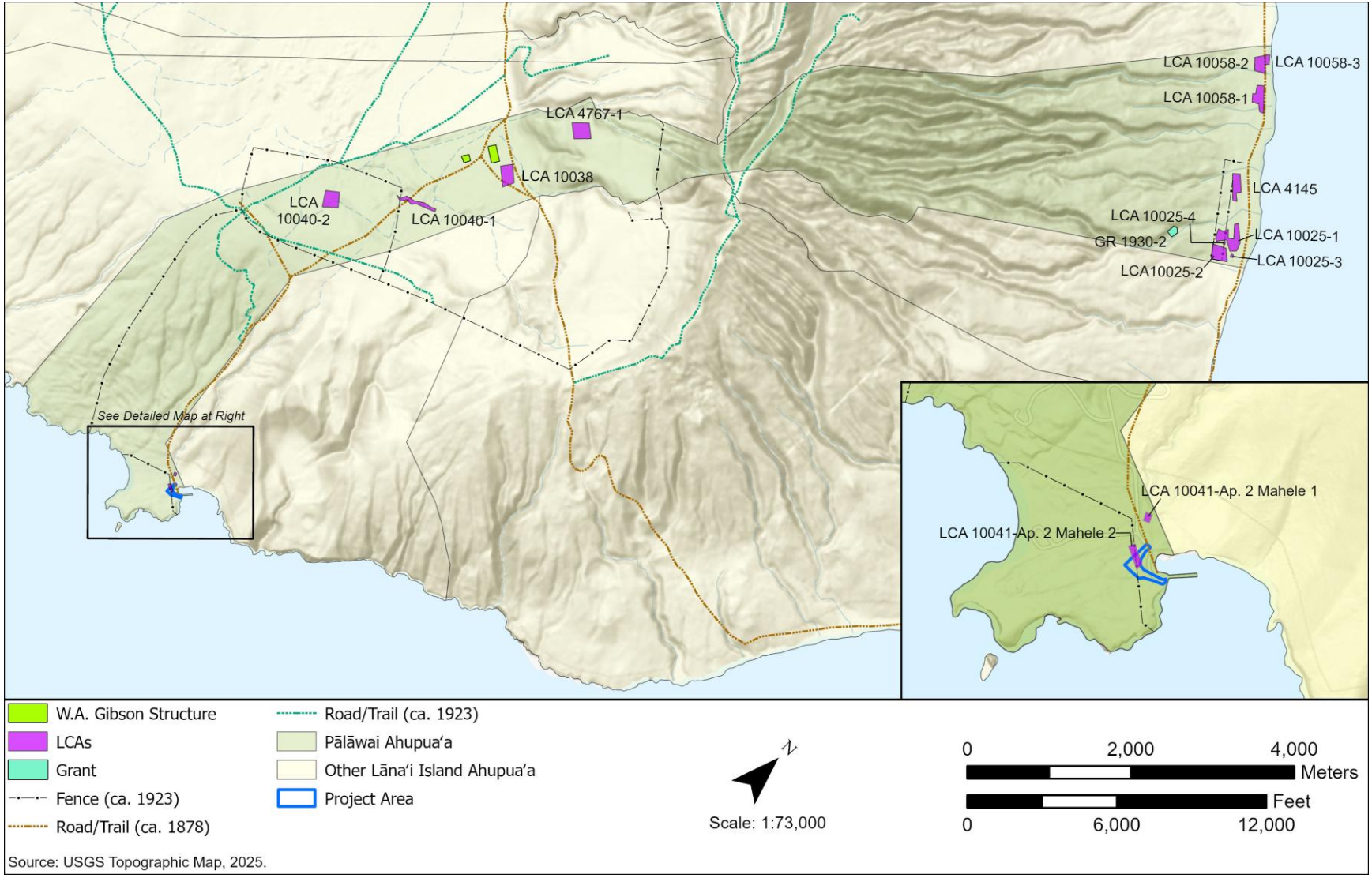


Figure 122. Map of LCAs, Land Grants, and other post-Contact features in Pālāwai Ahupua'a identified through archival research.

3.5.7 The Mormon Mission and W.M. Gibson's Purchase of Pālāwai

Mormons first traveled to the Hawaiian Islands in 1850, with the first Mormon missionaries on Lānaʻi arriving shortly after the Māhele. On October 17th, 1853, a special committee of Mormon elders traveled to Lānaʻi to make an inspection of Pālāwai Ahupuaʻa. Maly (2013)excerpts the report of the committee to Brigham Young, which noted that they found Pālāwai:

> "…well adapted in many respects for this purpose, the soil being good, the situation a central one and having ready intercourse with the principal markets, Honolulu and Lahaina, and sufficiently isolated to be comparatively free from the surrounding evil influences…" (Committee Report to Brigham Young, November 2 1853, as quoted by (Maly 2013:29).

At this time, the *ahupuaʻa* was owned by Levi Haʻalelea, who had inherited it from his wife, High Chiefess M. Kekauʻōnohi. Haʻalelea granted the missionaries a "four or five year" rent-free lease, in what was the earliest land conveyance on Lānaʻi (Maly 2013). The exact terms of this agreement are unclear, as Maly and Maly (n.d.) found no record of this conveyance during their research into the Records of the Bureau of Conveyances. The transaction is only known through the writings of the Mormon missionaries.

The Mormons focused most of their attention on the uplands of Pālāwai, referring to this area as the City of Joseph, and the valley it was situated in as the valley of Ephraim. One of the early Mormon missionaries, Ephraim Green, kept a journal that described trips to the coastal lands and other activities relevant to cultural practices in the Mānele area (in Maly 2013:30). Green described watching a fish poison made from a large bundle of weeds which were pounded up and bundled in leaves. The bait was scattered in the water, and upon eating it, the fish would become paralyzed and float to the surface where they could be easily caught and strung on cords. Based on its description, Maly (2013) suggested the weed in question was *ʻauhuhu* (*Tephrosia purpurea*).

In 1858, Brigham Young recalled the Mormon elders stationed at Pālāwai (and elsewhere) back to Utah to prepare for war with the United States Government. Those on Lānaʻi who had converted to Mormonism were left to manage on their own, until 1861, when Walter Murray Gibson arrived to Pālāwai and reorganized the congregation there. As Maly described it,

> "Gibson's short but colorful history as the leader of the Mormon flock set in motion events that transitioned Lānaʻi's land use practices, title to land, and eventual control over ninety-nine percent of the island's land assets. Of course, this control also shaped the lives of the native population as well" (Maly 2013:31).

A letter from Gibson to R.C. Wylie counted 186 adult members of the Mormon Church in 1861. The letter, which was published a few days later by the *Pacific Commercial Advertiser* (1861) to "throw some light on the doings and plans of the Mormons," included some further observations by Gibson about the church in Pālāwai, as well as Gibson's grand ambitions:

> The church has been clubbing together a little means, and has hoped to buy a body of land on this island, from the Government or from the chief Haalelea. The latter agreed to sell them the Palawai district for the moderate sum of $500, in order to befriend the poor church. However, this Palawai is mostly untillable lava, and consequently would not be as advantageous as might at first be supposed from its extent. Furthermore, there is not a single stream or spring in this district, and it is with much difficulty that the people manage to get enough drinking water. Sometimes they have brought water from Lahaina, and lugged it four

> miles from the beach to their homes in Palawai valley. But with all these disadvantages, they have been particularly healthy, and the church would rejoice if they could be gathered together on Lanai. In that case, with a large force of labor, I think that water could be brought profitably, to irrigate the valley, from a little stream near the N.W. extremity of the island—but I cannot be positive about the practicability of this undertaking. At any rate, some water for various purposes, though not very good, can be obtained by blasting out rock in the mountains. The poor Mormons get about six gallons of water from a few hollows in rocks, which are dry during the day, but exude this much during the night, and this is the chief drinking supply for all this people. But they have large numbers of goats and use some milk, and eat fresh goat's meat and mutton, with sweet potatoes, instead of exclusive poi and salt fish. (Letter from Capt. Walter M. Gibson to Minister R.C. Wyllie, October 18, 1861, as quoted in the Pacific Commercial Advertiser 1861)

Although Gibson ostensibly arrived to Lānaʻi to reinvigorate the Mormon faith in Pālāwai, an 1863 report by D. Baldwin observed that Gibson was "engaged mostly in agriculture, raising poultry and sheep, and in trafficking with the natives" (Baldwin 1863, as quoted in Maly 2013:34-35). In 1864, a group of Mormon missionaries were dispatched to investigate Gibson's activities on Lānaʻi, at the behest of some of the members of Gibson's church. The accounts of these missionaries paint Gibson as a charlatan and schemer who was taking advantage of his position to amass personal wealth and power at the expense of the church and his own congregation:

> During this time, Walter M. Gibson, a man of deep scheming policy, came to Utah—professed to adopt the faith of the Latter-day Saints, was baptized, took a short mission to the Eastern States, and when he returned started immediately for the Sandwich Islands, and there palmed himself on the unsuspecting natives as a superior personage, authorized by and superior to President Brigham Young, and claimed the presidency over all the Pacific isles.
>
> He re-organized the Church in accordance with his own schemes, ordained twelve Apostles, and charged them one hundred and fifty dollars each for the office conferred, and the High Priests and Elders in proportion. With means thus obtained he purchased one-half of the island of Lanai, where he gathered the Saints and all for his own aggrandizement.
>
> Fearing they might be deceived, some eight of the Elders wrote to brethren in Utah who had labored many years among them. They stated some of the facts concerning Mr. Gibson's course, and asked advice. This communication was translated and submitted to President Young. The First Presidency decided that Apostles Ezra T. Benson and Lorenzo Snow should visit the islands, and that Elders Joseph F. Smith, Alma Smith and William W. Cluff should accompany them. (Snow 1884:272-273)

Joseph F. Smith, one of the missionaries in the party sent to investigate Gibson, noted that Gibson had persuaded church members to "give all they had to the church and made it a test of fellowship" (Smith 1864 as quoted in Compton 2005:125). Another, Ezra T. Benson, further described Gibson's methods:

> The Saints had been constrained to turn over all their substance, horses, sheep, goats, poultry, houses and lands, to the Church to gather up to Lanai giving their time for the cultivation of the soil; and this many had done, receiving their food once a day from the hands of the head Bishop. (Benson 1864 as quoted in Compton 2005:125)

In 1863, Gibson had used the money amassed by the church to purchase the *ahupuaʻa* of Pālāwai from Levi Haʻalela for the sum of $3,000. Although Gibson had ostensibly purchased Pālāwai in the name of the church and for the benefit of his congregation, the deed was conveyed "to W.M. Gibson,

his heirs, assigns, executors, and administrators for all time" (Deed from Levi Haʻalela to Walter M. Gibson, February 23, 1863 (as translated by Maly 2013:73). According to Adler and Kamins (1986:71), it was common practice, and indeed encouraged by Mormon leadership, for elders to hold title to church lands in their own names to protect the church or to circumvent laws regarding church property.

Gibson had also begun building a new church in Pālāwai at the time of the missionaries' arrival. He had deemed the cornerstone of the church sacred and warned that "if any person touched it he would be struck dead":

> About one half mile from Mr. Gibson's residence was a large rock, the top several feet above the ground. Mr. Gibson had a chamber cut into this rock, in which he had deposited a Book of Mormon and other things, and called it the corner stone of a great temple, which would be erected there. A frame work of poles had been constructed, in a circular form, around this rock, and this was covered with brush. (Snow 1884:282)

The missionaries were under the impression that Gibson had "taught the Hawaiians to look upon him as an exalted person, even as a god" (Adler and Kamins 1986:73), and that he was organizing a military with the ultimate goal of building a Mormon empire across the Pacific. Ultimately, Snow and colleagues found that Gibson was attempting to usurp the church's authority, and by April 1864, Gibson had been excommunicated from the Mormon Church. They left Joseph F. Smith in charge of the mission and advised that "all those who wished to be considered in good standing in the Church, should leave Lanai and return to their homes on the other islands, where the branches would be re-organized and set in order by the brethren who would be left for that purpose" (Snow 1884:286).

Gibson may have been excommunicated from the church, but he had secured clear and free title to the *ahupuaʻa* of Pālāwai in his own name. Although there were a small number of attempts to contest Gibson's title or seek some kind of recompense, the church ultimately decided that legal action was going to cost them more than the land was worth, and they redirected their attentions to establishing a new settlement in Lāʻie. The Hawaiian Mormon population was recalcitrant to resettle and try again in Lāʻie, less than a year after Gibson was excommunicated. According to Smith, "They still feel very sore about the Gibson swindle, and none of them are at all anxious to enter into another land speculation" (Smith 1864 as quoted in Compton 2005:122). Smith noted:

> There is scarcely a man or woman in the Church but mourns the loss of his or her property in some way—neglected k[a]lo or potatoe [sic] patches, houses, gold, money spent in donating and going to and from Lanai, etc. (Smith 1864 as quoted in Compton 2005:125)

Gibson stayed on Lānaʻi after his excommunication, and established a ranch in Pālāwai, which shipped livestock and goods through Mānele Harbor. Later, he moved to Kōʻele in Kamoku Ahupuaʻa, and moved his shipping operations to the north coast. Gibson continued to acquire title to additional lands in Pālāwai and throughout the island. In 1868, a portion of the LCA in Mānele awarded to Kanekeleia (Helu 10041) was transferred to Gibson (Maly 2013). By 1875, Gibson had secured approximately nine-tenths of the island of Lānaʻi through fee-simple titles or long-term leases (Adler and Kamins 1986). When Gibson moved to Honolulu, his daughter Talula and her husband Fred Hayselden took over management of the ranch on Lānaʻi, which had by then become predominantly focused on sheep. After Gibson's passing in 1888, the Hayseldens inherited the ranch on Lānaʻi.

3.5.8 Post-Contact Ranching and Land Use

The many existing pre-Contact foot paths that connected Mānele with the uplands of Pālāwai, and Pālāwai with the rest of Lānaʻi, were developed into formal roads during the post-Contact period. Archival research by Maly (2013) suggests that the earliest known communication about roadway development was in 1854 and identifies Kaaina as the "Road Supervisor" for the island of Lānaʻi. In the span of 36 days, with public labor from 148 residents, six roads had been completed, including one at Pālāwai, associated with the Mānele Road.

The first Mormon missionaries in Pālāwai Basin also endeavored to transform the pre-Contact trail from Mānele into a more formalized road; however, these efforts ended when the Mormons were called back to Utah to prepare for war in 1857-58. When Gibson reestablished the Mormon settlement in Pālāwai, he wrote a letter to King Kamehameha III for assistance to develop a road and boat landing at Mānele. Maly (2013) provided excerpts of this letter, which gives some insight into Gibson's assessment of the conditions of the area at this time:

> …There is no road over which to carry our produce by wheeled conveyance; there is nothing but a dangerous bridle path through a wide belt of lava boulders, bound in the coast.
>
> It would require a large community well organized, or large capital, or the aid of Government to overcome these difficulties to settlement. Single handed agriculturalists could not subsist here.
>
> An organization like the one I represent is qualified to overcome, these difficulties and make this waste territory a source-of subsistence for thousands of Your Majesty's native subjects.
>
> We would if in possession of the land make a good wagon road to the coast. We would also construct wells, and substantial cisterns; or even reservoirs for the purposes of irrigation. We have constructed some small cisterns for domestic use.
>
> Furthermore we would construct a slip at the roadstead of Manele suitable for the safe mooring of one or more coasting craft… (Letter from W.M. Gibson, July 16, 1862, as quoted in Maly 2013:92-93)

Maly (2013) also translated a report in *Ka Nupepa Kuokoa* from January 23, 1869, where two visitors to Lānaʻi critiqued the road from Mānele:

> If there is one thing which might be poorly spoken of, and a work which must be redone, it is this. Mr. Henry [Gibson] is the Government Agent; there are about 20 fathoms in length, and two fatoms [sic] in width of the road. It is paved with stones, and very good. If the rest to the uplands could be the same a cart could reach to the shore at Manele. ("M. & K." of "Snow Hill, Olowalu" in Ka Nupepa Kuokoa, January 23, 1869, as translated by (Maly 2013:93)

In 1869, W.M. Gibson's son, John L. Gibson, was appointed road supervisor and continued to seek support in improving the road. Excerpts from his letter provide insights into daily life, resources, and transportation around Pālāwai at this time:

> …I propose to make a good cart road from Manele Bay to the top of the ridge entering into Palawai Valley as condition at this time is like that of the bed of a mountain torrent. The best that could be done heretofore with the few days of labor devoted to road work, was merely to throw stones out of the way and throw in a little dirt which is washed away by the first

> rain. I propose to make an easy grade up this most important road of the island, which is constantly used by the most of His Majesty's subjects resident upon the island. I wish to make a small bridge across a wash or gulch, the timber for which I hope the Department will supply for the use of the road outside of the money appropriation. I subjoin a list of timber, and certain utensils needed.
>
> The whole of the appropriation mentioned by you $300. will be needed for labor to make a good cart road to Manele, the only one upon which my freight is carried. The larger portion of His Majesty's subjects live Mauka and use this road. The smaller portion who reside on the N.E. beach, who are chiefly fishermen, have only a trade intercourse with Lahaina by boats and canoes, of course a good road to Manele will greatly benefit my father's estate, who has however increased the report of the island from nothing to quite a respectable figure, and he proposes to supplement with his own means the aid rendered by the Government in working this road… (Letter from J.L. Gibson, March 22, 1869, as quoted by Maly 2013:93-94)

Subsequent to this request, J.L. Gibson received permission to work on the road that spanned the area from Mānele to Pālāwai Basin. By 1870, the road had been improved to the point where wagons could travel from Mānele into the valley, and an 1871 inspection of the road deemed it to be a "very passable one" that could travel a cart from Mānele landing to "any part of the upland" (Hawaii State Archives, August 26, 1871, as quoted by Maly 2013:94). In 1876, Gibson requested further funds for road improvements, noting that the road now led from Mānele across the island to Awalua. Maly (2013) notes that the alignment of this road can still be seen at points along the existing paved road (Figure 123).

Gibson and his family were highly invested in road improvements, as this facilitated better transport of their ranching stock across the island and to Mānele Bay, where they could be shipped. The post-Contact introduction of nonnative species to the Hawaiian Islands, which included large-bodied herbivores like the domestic sheep, goat, and cow, often had devastating effects on landscapes and ecosystems, and Lānaʻi was no different in this regard. These introductions first arrived to Lānaʻi in the 1830s, initially on a small, and highly managed scale. Larger-scale ranching efforts on Lānaʻi began in the 1850s, with the initial Mormon endeavor to establish a mission in Pālāwai. When Gibson took over these efforts in the 1860s, he expanded upon the initial ranching attempts. Maly (2013) estimates that by the 1890s, nearly 100,000 sheep and goats roamed the island, with very little attempt at management. The accumulated effects of these animals led to severe and rapid deforestation and the decline of freshwater resources across Lānaʻi.

Henke's (1929) survey of livestock in Hawaiʻi details the history of ownership and ranching land use from the time of Gibson's arrival to 1929. In 1888, after Gibson's passing, his daughter Talula Hayselden took over ownership of the sheep ranch she and her husband had helped Gibson develop. The Hayseldens eventually sold their holdings on Lānaʻi:

> Gibson and the Hayseldens developed a sheep ranch on the Island, much of which was then owned by the government and by W.G. Irwin. Irwin later acquired the Government lands and the Hayseldens about 1902 sold out to Charles Gay and nearly the whole Island of 89,600 acres was combined under the ownership of Charles Gay, which passed to Irwin in 1910 and from him to John D. McCrosson and associates in the same year, when the Lanai Company, Ltd., was formed. Their interests were sold in 1917 to H.A. and F.F. Baldwin, who in turn sold the property to the Hawaiian Pineapple Co., Ltd., in December, 1922, who are the present owners. (Henke 1929:51-52)

Gay maintained the sheep ranch he had purchased from the Hayseldens until 1910 and continued to improve the road from Mānele to facilitate the shipping of crops and livestock from the Mānele Landing. Gay eventually acquired all of the government lands on Lānaʻi by exchanging his properties in Honolulu, which further consolidated private ownership of the island. According to the recollections of Lawrence Kainoahou Gay, the son of Charles Gay, most of these fee-simple lands were then taken over by the Lanai Company, Ltd., which was founded by Cecil Brown of the First National Bank. The Gay family was left with roughly 600 acres to continue their ranch operations (Gay 1965).

After an unsuccessful venture in sugar beet agriculture, the Lanai Company, Ltd. was sold to Frank and Harry Baldwin, who transitioned the ranching efforts to cattle. This required new fencing and water provisioning and involved eradicating tens of thousands of goats, sheep, and pigs by driving them over the cliffs of Kaʻapahu in Kaʻā (Maly 2013). In 1911, the ranch held 20,588 sheep and 799 cattle. By the end of 1920, the number of sheep had dwindled to 860, and by 1923 the number of cattle had increased to 5,536, with an additional 4,462 having been sold in the previous five years.

In 1922, the ranch was acquired as part of the Hawaiian Pineapple Company, who began to reduce the cattle herd to make way for large-scale pineapple cultivation. By 1929, the ranch had around 2,000 cattle and 180 horses roaming across 55,000 acres of "fairly well grassed but rocky and arid country extending in a belt around the 55 miles of coast line of Lanai" (Henke 1929:51). Henke anticipated the ranch would do little more in the future than supply beef and horses for the needs of the more profitable pineapple plantation. In the 1930s, the Hawaiian Pineapple Company also established a piggery operation in Pālāwai, which was in operation until 1951. Maly (2014) described it as a "first-class operation with cement floors, enclosed pens, open range, and rail tracks for transporting feed" (Maly 2014:78).

In 1951, the Hawaiian Pineapple Company began focusing all of its efforts on the pineapple plantation, and the ranch ended its operations. A 1948 Lānaʻi Ranch Company Map reproduced by Maly (2013:90) shows that at this time, Mānele Bay was located within Paddock 13. Around 1960, the road from Mānele Bay was paved, and over time, some sections were realigned to smooth out the bends and curves to make driving the road easier. Maly (2013) states that the harbor improvements projects conducted between the 1960s and 1970s have erased the traces of earlier trails and roads.

The infrastructure from the former piggery operation remained on the island, and an agriculture teacher at Lānaʻi High and Elementary School reopened operations from the mid-1950s until the early 1960s. In the 1960s, the Palumbo family leased the two-acre property that housed the piggery and began restoring the area. This site, which was home to the Mormon settlement in the 1850s and a piggery in the early 1900s, then became a gathering space known as "Pigeon City" from the 1970s to 1989 (Maly 2014).

The final harvest of pineapples on Lānaʻi occurred in November 1992, though Maly observed that it is still possible to look across Pālāwai Basin and see the outline of old pineapple field boundaries, spread across the landscape like a quilt (Maly 2014:80).



Figure 123. A 1954 USGS map showing the paved road leading from Mānele Bay to the uplands and Lanai City. This paved road was built on top of or near preexisting roads, including pre-Contact trail routes.

3.5.9 Mānele Harbor

Mormon settlers in the 1850s recognized Mānele Bay as a valuable port for moving people and goods to and from the island. By 1862, interisland steamers were stopping at Mānele (Maly 2013). In the early days of Gibson's sheep ranching operation, most of the shipping was done through Mānele Harbor. In 1873, Gibson published an account of transporting sheep between Maui and Lānaʻi in his newspaper, *Nuhou*. He described his arrival at Mānele Harbor and the surrounding landscape of Pālāwai during this time:

> The shrill whistle at about four in the morning, waked the echoes among the lofty bluffs that form the heads of the Bay of Manele on the southeastern end of the island. A pull of ten minutes brought us inside our breakwater, and here being free from the break of the surf, we and our young companion landed all safe and dry at our very boat house door. Loving eyes had watched for us, and we found fat Lanai horses ready to bear us in the cool grey of the morning up the hills into the mountain valley of Palawai. It looked lovely as when it first won our heart. Round, ten miles round, level, green and smiling. The terraced and shrub adorned hills set back like a throne for a heavenly majesty; and the canopy of cloud softened the glory which the god of day shed in dawning splendors over the scene of flowered vale, and green wooded ravines and hills.
>
> ...we mounted our gallant gray Bense and galloped with a faithful shepherdess across the valley of Palawai, and through the forest of Kamoku to look at flocks that fed on the western slopes, and then we galloped back to see those of the coast, making some fifteen miles…
>
> …We noticed by the way, that the grass was very fine. Plenty of "crab grasses," or kukae puaa and kukae lio; also maniania, or Bermuda grass in streaks and patches, Spanish clover and alfalfa, now Bokbara clover, herds' grass, orchard grass, dandelion, lambs' quarter, pursley [sic], sour sorrel, wild turnips and lettuce, wild mint so fragrant under the horses' hoofs, and salivas, ilimas, nasturtiums, morning glories, Popolos, wild strawberries, daisies, verbenas, poppies, jasmines and hundreds more of grasses and plants, either sparkling with blossom, or nodding with seed, throughout the radiant hills and lovely vales. (Gibson 1873 as quoted by Maly 2013:39)

The account also relayed the various dangers encountered on sailing trips between Mānele Harbor and Maui:

> Some seven years ago two boats left Manele laden with sheep for Lahaina. The Shepherd in one with Punika, Hokii and Lapaki; and Kealakaa in the other with some women and children. The channel was white, and yet they ventured. The staunch centre boat, Talula, stood up well to the wind for a time, but after a while she would not beat, she drifted, fell off, and went to leeward; and Kealakaa, with a weaker boat, had drifted still farther. A fierce wind tearing out of Maalaea Bay now drove them, and they could not get back to their landing. Punika said they could run for Kahoolawe; but they saw a sign of distress from Kealakaa's boat drifting out to sea, and so they let their chance go by, and ran down to help the women and children. (Gibson 1873 as quoted in Maly 2013:40)

A breakwater was built in 1873 to protect a portion of the bay, and a boat house was built near the shore. These early constructions continued to be used and appreciated at least through the 1950s, when the Hawaii Pineapple Company purchased the ranch at Pālāwai, and plantation families frequented the bay for recreation purposes (Maly 2013). Apart from the documentation of the breakwater and boat house, archival research has turned up little else about the early development of Mānele Harbor.

In 1875, the *Pacific Commercial Advertiser* reported that the Schooner Owana had wrecked in Mānele Bay while on its way to pick up sheep from Lānaʻi:

> The wreck of the schooner Owana was attended by some rather peculiar circumstances. The Captain was ordered to go to Lanai for sheep. He had a sack of money on board for the purchase of his freight, which money he placed for greater security, as he alleges, down in the hold, in a crevice, alongside of the keel. In approaching his port, on the eastern end, as we stated last week, the one known as "Manele Landing," he ventured through a narrow channel between the rock Puupehe and the mainland, which a whale boat cannot pass at low water, and he touched ground, as he was well assured he would, and knocked a hole in his bottom, exactly at the spot where the money lay, which of course must have fallen into the sea. But the schooner was by no means a wreck at this time, although leaking rather freely. She entered her port, the bay of Manele, about noon, on a calm clear day. On nearing the usual anchorage, the captain jumped into the schooner's small boat, that was towing alongside, and went ashore, avowedly to get assistance. At the time of his leaving, his crew, two native, were below, busily engaged in trying to stop the leak.
>
> Whilst so engaged, the [sic] felt the vessel bump against the rocks, and rushing on deck, they ground their craft on shore, and observed that the captain had forgotten to throw the anchor overboard. The men left the wreck, and as they could see nothing of their captain, they allowed the Owana to thrash about in the surf til she broke up into firewood, without trying to save a stick or rope. The schooner is owned by a native in town, and the money belonged to another native. ("Notes of the Week," *Pacific Commercial Advertiser*, December 11, 1875, as quoted in Maly 2013:41)

Cliff diving, or *lele kawa* (to leap feet first from a cliff into water without splashing; Pukui and Elbert (1986:202) was a favored activity in Mānele. According to oral historical research by Maly (2013), the cliffs on the southwest section of the Mānele coastline held the favored diving spot at Lainohaunui.

In 1881, Walter Murray Gibson published a serial in the *Pacific Commercial Advertiser* (at this time owned by Gibson) called "Lajos: A story of Hungary and the Hawaiian Islands," which related a story of the star-crossed love between a Hungarian Baroness' son Lajos, and a shepherd's daughter named Zoe. The lovers' parents conspired to break their union by sending Zoe away, but Lajos traveled the world to find her again. The story printed in the *Pacific Commercial Advertiser* picks up when Lajos' quest to find Zoe brings him to Honolulu. Part VII relates the travels of Lajos and his companion Poytash to Mānele, and their experiences with *lele kawa* (*Pacific Commercial Advertiser* April 30, 1881).

When Lajos and Poytash arrived to Mānele, they found that a feast was being held there in celebration of the large watermelon yield that had grown among the rocks in the sands of Mānele. They observed people celebrating by drinking fermented watermelon juice from large calabashes and cliff diving:

> Bold bluffs, ranging in height from a few feet to several hundreds, extend around the coast on either side of Manele Bay. From several points along these bluffs, the natives were accustomed to leap. At one point where the plummet line had been dropped one hundred and fifty-two feet, from the top of the bluff down to the water, some few of the boldest natives and stoutest swimmers would leap. Lono and a few others were the only ones on the island who dared this great leap, and who, without any dressing, strapping, or protection of any kind, would spring from this dizzy height into the gulf below. At another point where the top of the bluff was about eighty feet high, many of the strong men and some of the women

> of the island would take the leap and sport in the waters below. But there was one favorite place, quite near the landing, where the crest of a bold bluff overhung about forty-five feet above the water, and here every swimmer of the island of every age would readily leap.
>
> On this occasion there were over one hundred men, women, and children assembled. And as the haoles (foreigners) were anxious to witness the feats of leaping and diving, there was a constant train of jumpers. The men were bound with their malo or breechcloth, and the women had arranged a mumu or chemise, as a tight fitting pau, or short trouser. There were boys and girls of as tender an age as seven or eight years, who readily took this bold leap, and as the surging tide below would heave them on the rocky ledge of the shore beneath the overhanging bluff, they would clamber up in the face of this sheer sea wall to the top again, simply by help of a few jutting points of rock, or crevices to which they could cling, merely with the ends of fingers and toes… (*Pacific Commercial Advertiser* April 30, 1881)

After watching the cliff diving, Lajos rather foolishly determined to make the jump himself after being beckoned by a beautiful young Hawaiian woman, Kalili. The dive nearly killed Lajos, and he was rescued by a group of cliff divers and brought to shore. While convalescing, Lajos forgot his love Zoe in favor of Kalili, who had tended to him during this time. Part IX of this tale relates Lajos and Kalili's departure from Mānele Bay on the schooner Manuokawai, and the *mele* sung by Kaniniu to bid them farewell:

> Who shall sit on the hill top?
> On the hill top of Iviole?
> Who shall sit in the hala grove?
> Among the halas of Iviole?
> Who shall leap the cliff?
> The high cliff of Manele?
> The goat will roam the hill top.
> To browse away the twigs of ohia.
> The sheep will feed in the hala grove,
> On the tender leaves of Kowali.
> And the lone maidens will leap.
> Will leap the high cliff of Manele.
> For Lui goes far away,
> He leaves the hill top, the grove,
> And the cliff of Manele.
> Love, O, Love, go with the young chief!
> Love, O, Love, hold him fast here!
> Love, O, Love, the girl of Hawaii!
> Sweeter by far than a girl of white skin.
> Lui and Kalili, love, O, Love!
> Lui and Kalili, love for evermore!
> (*Pacific Commercial Advertiser* May 14, 1881)

Gay (1965) provided a description of Mānele Harbor as he remembered it in 1902, when he first arrived there as a child with his family:

> We finally reached Manele Harbor and the anchor was dropped about two hundred yards off shore…
>
> The lifeboats were lowered, and we were the first to be taken ashore to a little landing place, a slight improvement over the famous "Plymouth Rock." The improvement consisted of four pieces of 4"x6"x6' and three pieces of 2"x12"x12', improvised in such a way to keep the boat

> from scraping against the rocks. There were no breakers, so we landed without any mishap. (Gay 1965:10)

A photograph of Mānele Landing partially destroyed by a Kona storm included in Gay's monograph (Gay 1965:11) suggests the landing was not always so peaceful. Gay recalled sleeping in a one-room house located on the top of the hill overlooking the harbor while at Mānele, and spending time fishing along the seashore or by boat, where fish of all kinds were plentiful. In the later years, when the Gay family began planting pineapples under contract with the Haiku Pineapple Company, Gay recalled spending weeks hauling pineapple tops from Maui to Mānele Harbor: "The sea was usually rough and with a boat in tow, added hours of discomfort to our pineapple parade" (Gay 1965:39).

Around 1920, the ranch operation under the Baldwins built a cattle chute near the Leinohaunui bluffs so that the steamers running between Maui and Lānaʻi could more easily unload cattle, goods, and passengers (Maly 2013). After the Hawaiian Pineapple Company acquired the ranch at Pālāwai in 1922, Mānele Landing became a popular place for plantation families to spend time. The company had built several beach houses at Mānele, and small fishing boats could be stored in the bay.

In the 1930s, mortar salt beds were added to the landing at Mānele, though these were moved to the cliffs in 1943 (Maly 2014). A 1941 photograph of Mānele Harbor shows the bay as still largely unimproved with sand dunes stretching from Mānele to Hulopoʻe Beach (Figure 124).

During the mid-twentieth century, further development occurred at Mānele Bay. In 1964-65, bulldozing associated with the Mānele Small Boat Harbor Project impacted a number of significant archaeological sites in and around the harbor area. The project also encountered burials, and it was believed that these events provoked a number of subsequent mishaps to the large equipment at the site. According to Maly (2013), Kahu Daniel Kaopuiki, Sr. was called to offer a blessing to the site, and to request that "those things of the past be released, so that the crew and work could progress in completing the harbor" (Maly 2013:101). Subsequent wharf development in 1971 also resulted in the destruction of a number of archaeological features (Figure 125, Figure 126).



Figure 124. A 1941 photograph of Mānele Harbor, titled "Puupehe, Lanai, T.H.," showing the largely unimproved landscape and the sand dunes connected Mānele Harbor (right) and Hulopoʻe Beach (left) (U.S. National Archives and Records Administration).



Figure 125. A 1984 USGS Map showing more recent developments around Mānele, including a Marine Life Conservation District and US Coast Guard Reservation.



Figure 126. A 1974 photograph of the Mānele Harbor Facility and Diversion Channel Site. The area of Site 157, which was impacted by the drainage diversion project, is located in the background, under the *kiawe* growth (photo courtesy of Kepā Maly).

3.5.10 Previous Consultation Efforts in Pālāwai Ahupuaʻa

Extensive ethnographic research has previously been conducted for this area, primarily by Kepā Maly. As much of this research took place prior to the publication of guidelines for assessing cultural impacts (OEQC 1997), ethnographic observations and firsthand interviews were not necessarily conducted with the primary aim of assessing impacts and mitigation strategies. Instead, this work provides a rich ethnographic resource from which to derive previous cultural practices and culturally significant resources, as well as to infer potential impacts of the current project. A summary of oral history information gathered by Maly starting in the 1970s and continuing into the 2010s is provided in Maly (2017), where he notes that "through the interviews and research, information with time depth is available which can help formulate stewardship actions and respectful decision making, in a manner that will perpetuate traditional knowledge and protect on-going practices" (Maly 2017:105).

During interviews with Solomon Kaopuiki, it was noted that in locations along Lānaʻi's shoreline with high cliffs like Mānele, families would fish among schools of abundant *akule* and *ʻōpelu* (Maly 2017:107). Henry Ah Yin Kau Aki spoke about diving near the harbor, and related his past desire to spear a shark at Mānele with a bamboo jabbing spear:

> When I shot the big uhu, the shark came by. I look at 'em I say, "You not going take my uhu." I was going to poke 'em, when I came home I told my mother. My mother said, "Don't you poke that shark now, you leave that shark alone." Manō, we call that. "Why?" "Don't poke the shark." She said, "it's our family." (Henry Ah Yin Kau Aki as quoted in Maly 2017:116-117)

Samuel Kaopuiki observed that in earlier times, families would travel across the island on trails to fish seasonally: one season was for fishing at Keōmoku and the surrounding area, and another for fishing at Kaumālapaʻu, Kaunolū, and Pālāwai. He likened the ocean to a "Hawaiian ice box," noting that when one side of the ice box was diminished, you would take from the other side. And importantly, to "always respect the ocean, and take only what you need for family use" (Maly 2017:118).

Noboru Oyama discussed the group volunteer labor projects that he participated in during the 1951 pineapple strike. The strike lasted seven months, and during this time many of the striking employees engaged in large-scale stewardship-maintenance projects. Among these projects was the development of the Mānele wading pool, which was constructed through dynamite blasting followed by pick and shovel work (Maly 2017:139). According to Benita Remiticado Ruidas, the wading pool was also known as "Keiki Pond," and its construction in the white sand area of Mānele was organized by the Lanai Welfare Association (Maly 2017:144).

3.5.11 Previous Archaeology

A total of 14 archaeological studies have been conducted within a 0.5-mile (0.8-km) buffer around the Lānaʻi portion of the HIFL project area at Mānele Harbor (Table 18 and Figure 127). The table provide an overview of all 14 archaeological investigations with a summary of their findings. The 29 previously identified historic properties within the 0.5-mile buffer are described in Table 19, which also contains significance assessments and mitigation recommendations. These historic properties are shown in Figure 128.

The historic properties identified in the vicinity of the project area reflect Mānele's intensive pre-Contact use as a village site and burial area. This includes a number of complexes that include pre-Contact habitation, agricultural, ceremonial, and burial sites. Post-Contact historic properties are mostly related to ranching activities and associated infrastructure, such as a boundary wall, well, roadway and trail complex, and a cattle chute and holding pen. Much of the surrounding area, including several burial sites, were significantly disturbed by bulldozing and other construction activities associated with the Mānele Small Boat Harbor Project in 1964-65. No historic properties have been identified previously within the Lānaʻi portion of the HIFL project area.

During Pacific Legacy's field inspection, carried out as part of the LRFI for the HIFL Project, two potential historic properties were identified within the Lānaʻi portion of the HIFL project area. These included a concrete ditch segment and a retaining wall constructed of basalt stones likely related to post-Contact ranching and related activities at Mānele Harbor.

Table 18. Summary of Previous Archaeological Studies Within 0.5 Miles of the Lānaʻi Portion of the HIFL Project Area

Reference	Type of Study	Findings
Emory 1924	Archaeological Survey	Conducted an island-wide survey of Lānaʻi. Two sites associated with the pre-Contact period were identified within 0.5 miles of the current project area: Puʻupehe platform (later assigned SIHP 50-40-98-00019) and the Mānele coastal habitation complex (no SIHP). No significance assessments or mitigation recommendations were made.
Soehren 1964	Archaeological Monitoring	Identified six historic properties, including two previously identified sites: Puʻupehe platform (Site A3-1, later assigned SIHP -00019) and a cist burial (Site A2-6, later assigned SIHP 50-40-98-00017). Four additional sites were newly recorded: a small house platform (Site A2-2; later assigned SIHP 50-40-98-00157), a small cist grave (Site A2-3; also designated as part of SIHP -00157), a rectangular enclosure (Site A2-4; designated as part of SIHP -00157), and several old platforms (Site A2-5; later assigned SIHP 50-40-98-00016). No significance assessments or mitigation recommendations were made.
Ching and Austin 1971	Archaeological Reconnaissance	Identified 15 pre-Contact archaeological features (T-1 through T-15, no SIHP numbers assigned), all of which are within 0.5 miles of the project area. These included rock platforms (T-1, T-12, T-13), walls (T-2, T-3, T-6, T-7, T-9, T-11, and T-15), possible burial sites (T-4 and T-8), a possible shrine (T-5), and an enclosure (T-10). All features were assessed as not significant and recommended for no further work. Features T-7 through T-15 were destroyed by construction activity.
Bishop Museum 1974 (as cited in Maly 2020)	Site Inventory of Lānaʻi	Conducted an island-wide survey for the statewide inventory, with limited recordation of four sites within 0.5 miles of the current study area: SIHP -00016, platforms; 50-40-98-00085, a complex with 63 features; -00157, a complex with 4 features; and 50-40-98-01007, an old boiler and historic debris. The results of this survey relevant to Mānele Harbor are summarized in Maly (2020 Appendix A:8-9).
Sinoto 1978	Archaeological Reconnaissance	No historic properties identified.
Kaschko and Athens 1987	Archaeological Inventory Survey	A total of 33 historic properties were identified, including 27 newly identified historic properties: SIHP 50-40-98-01500 through 50-40-98-01526;and six previously identified sites (SIHP -00016, -00019, 50-40-98-00078, -00085, and -00157, and -01007). Twenty-three of the newly identified sites and all six of the previously recorded sites are

Reference	Type of Study	Findings
		located within 0.5 miles of the current project area, and represent a range of pre-Contact site types, burials, and one probable military feature. All 33 historic properties were assessed as significant under Criterion d. Additionally, SIHP -00019, -00078, -00085, -00157, and -01524 were assessed as significant under Criteria c and e, SHIP -01522, -01525, and -01526 under Criterion c and SIHP -01502, -01517 under Criterion e. All sites were recommended for data recovery, except SIHP -00019, which was recommended for preservation. SIHP -00016, -00078, -00085, -00157, -01522, -01524 through 01526, were also recommended for preservation.
Athens 1991	Data Recovery	Data recovery of two features associated with SIHP -00085. No significance assessments were made; SIHP -00085 was recommended for preservation.
Kaschko 1991a	Archaeological Inventory Survey	Recorded two previously identified historic properties: SIHP -01516 and -01517, both of which are located within 0.5 miles of the current project area. No significance assessments were made; both sites were recommended for data recovery.
Kaschko 1991b	Archaeological Inventory Survey	Recorded four previously identified historic properties: SIHP -01519, -01521, -01522, and -01523, all of which are located within 0.5 miles of the current project area. All four sites were recommended for data recovery. No significance assessments were made.
Athens et al. 1992 (Draft)	Archaeological Investigation	Detailed mapping and data recovery for eight previously identified historic properties: SIHP -00085, -01506, -01507, -01508, -01511, -01513, and -01514). All sites, except SIHP -01511, are within 0.5 miles of the current project area.
Athens et al. 2000a, Athens et al. 2000b, Tomonari-Tuggle et al. 2000	Data Recovery	Conducted data recovery and published three volumes in the area previously surveyed by Kaschko and Athens 1987. Recorded six previously identified historic properties, four of which are located within 0.5 miles of the current project area: SIHP -00085, -01506, -01508, and -01514) Subsurface testing added four additional features to SIHP -00085. No significance assessments or recommendations were made.
Berrigan et al. 2008	Archaeological Monitoring	Documented four new subsurface hearth features and one posthole during archaeological monitoring. Two hearth features and a posthole were added to the previously identified SIHP -01523, and two hearth features were added to the previously identified SIHP -01525. The study made a general recommendation for archaeological monitoring of all ground-disturbing activities within and adjacent to the Mānele Bay sites, as well as data recovery. The western terrace of SIHP -01523 was recommended for preservation.
Dye et al. 2013	Archaeological Inventory Survey Addendum	Addendum to AIS by Kaschko and Athens (1987). New features were identified for three sites: SIHP -00157 Feature EE, an amorphous mound of basalt cobbles; SIHP -1524 Feature O, a grinding basin, and Feature P, a modified dike outcrop likely quarried for adze-quality rock; SIHP -01525 Features G, a partially collapsed rock alignment, Feature H, a three-sided terrace, and Feature I, a collapsed C-shaped enclosure.
Lee-Greig and Hammatt 2013	Archaeological Inventory Survey	Relocated five previously identified historic properties (SIHP -00085, -01007, -01513, -01515, and -01526) and added six new features to SIHP -00085 (Feature FFF, an agricultural mound; Feature GGG, an

Reference	Type of Study	Findings
		temporary habitation enclosure; Features HHH and KKK, agricultural terrace ; Feature III, a possible planting pit; and Feature JJJ, an indeterminate terrace) and one new feature to SIHP -01515 (Feature B, a temporary habitation terrace). SIHP -01508 was not relocated and was presumed to have been destroyed during previous construction activities. All five remaining sites were assessed as significant under Criterion d. Additionally, SIHP -00085 was assessed as significant under Criteria c and e, and SIHP -01526 under Criterion c. SIHP -00085, -01513, -01515, and -01526 were recommended for preservation and SIHP -01007 for data recovery with preservation commitments.

Note: Previous studies that include the current project area are highlighted in gray.

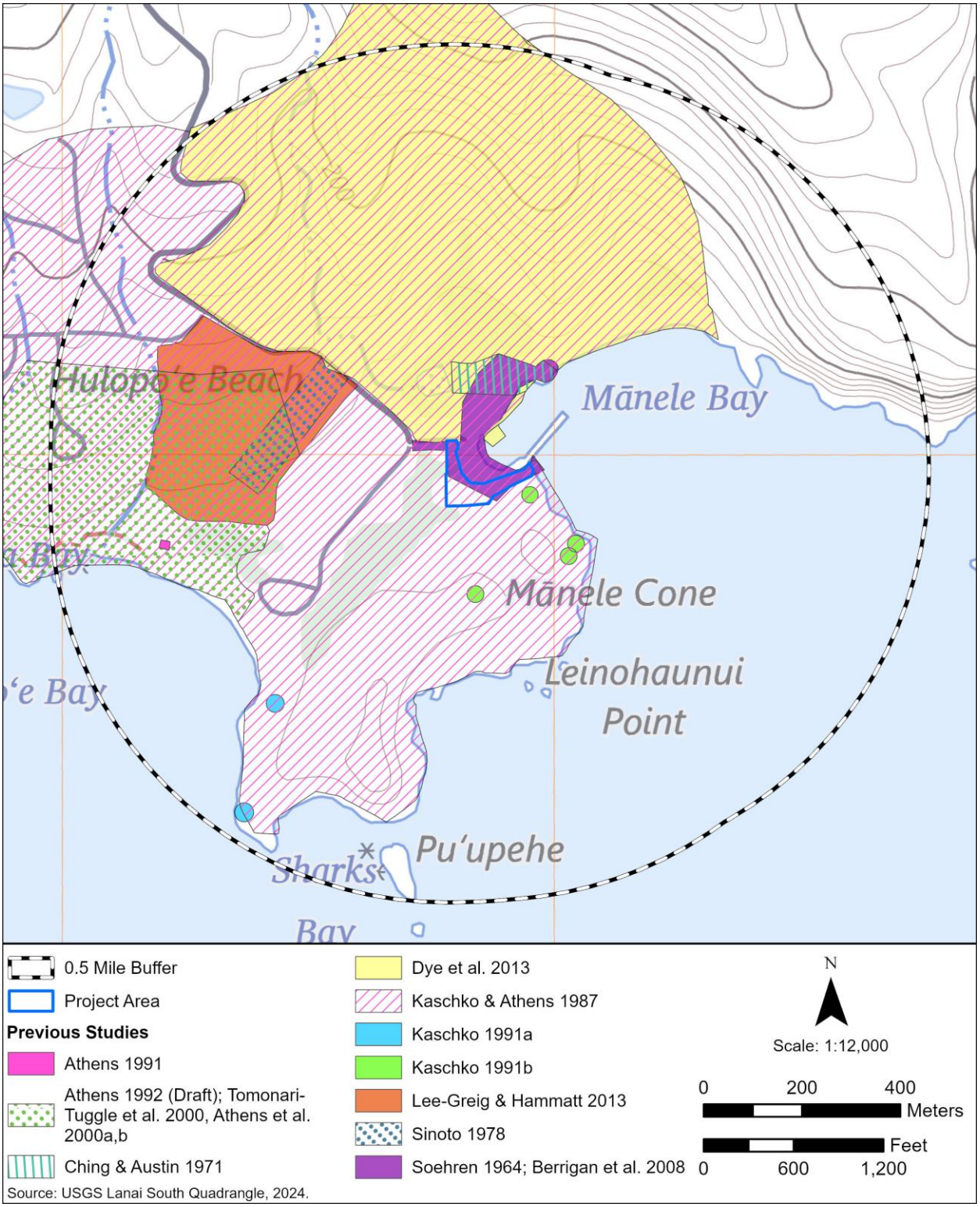


Figure 127. Previous archaeological studies conducted within 0.5 miles of the Lānaʻi portion of the HIFL project area.

Table 19. Previously Identified Historic Properties Within 0.5 Miles of the Lānaʻi Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
50-40-98-00016	Complex of 4 features (platform and terraces)	Possible burial complex	Pre-Contact	d, e	Data Recovery (Kaschko and Athens 1987); Burial Treatment Plan/ Preservation (Dye et al. 2013)	Soehren 1964; Bishop Museum 1974 (as cited in Maly 2020); Kaschko and Athens 1987; Dye et al. 2013
50-40-98-00019	Platform	Possible bird hunter's shrine	Pre-Contact	c, d, e	Preservation (Kaschko and Athens 1987)	Emory 1924; Soehren 1964; Kaschko and Athens 1987
50-40-98-00078	Complex of 12 features (terraces, enclosures)	Habitation, ceremonial, burial	Pre-Contact	c, d, e	Preservation/ Data Recovery (Kaschko and Athens 1987); Burial Treatment Plan/ Preservation (Dye et al. 2013)	Bishop Museum 1974 (as cited in Maly 2020); Kaschko and Athens 1987; Dye et al. 2013
50-40-98-00085	Complex of 63 features (enclosures, terraces, C-shapes, L-shapes, cairns, platforms, rock shelters, wall, mound, possible planting pits)	Habitation, burial, agricultural	Pre-Contact	c, d, e	Preservation/ Data Recovery ((Kaschko and Athens 1987); *in situ* Preservation (Athens 1991); Preservation (Athens et al. 1992, Lee-Greig and Hammatt 2013)	Bishop Museum 1974 (as cited in Maly 2020); Kaschko and Athens 1987; Athens 1991; Athens et al. 1992; Tomonari-Tuggle et al. 2000; Lee-Greig and Hammatt 2013
50-40-98-00157	Complex of 30 features (terraces, enclosures, platforms, C-shapes, cist, pavement)	Habitation, ceremonial, burial	Pre-Contact	c, d, e	Preservation/ Data Recovery (Kaschko and Athens 1987); Burial Treatment Plan/ Preservation (Dye et al. 2013)	Emory 1924; Soehren 1964; Ching and Austin 1971; Bishop Museum 1974 (as cited in Maly 2020); Kaschko and Athens 1987; Dye et al. 2013
50-40-98-01007	Old boiler and historic debris	Cultural material area	Post-Contact	d	Data Recovery (Kaschko and Athens 1987); Data Recovery/ Preservation (Lee-Greig and Hammatt 2013)	Bishop Museum 1974 (as cited in Maly 2020); Kaschko and Athens 1987; Lee-Greig and Hammatt 2013

Site Number	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
50-40-98-01500	Historic wall	Boundary	Post-Contact	d	Data Recovery	Kaschko and Athens 1987; Dye et al. 2013
50-40-98-01502	Small complex	Possible burial, indeterminate	Pre-Contact or Post-Contact	d, e	Data Recovery (Kaschko and Athens 1987); Burial Treatment Plan/ Preservation (Dye et al. 2013)	Kaschko and Athens 1987; Dye et al. 2013
50-40-98-01503	Two C-shapes	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Dye et al. 2013
50-40-98-01504	Complex of 2 features (2 cairns, rock shelter)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Dye et al. 2013
50-40-98-01505	Complex of 6 features (terraces, C-shapes)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Dye et al. 2013
50-40-98-01506	Two adjacent, "cupboard" features	Storage	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Athens 1991; Athens et al. 1992; Tomonari-Tuggle et al. 2000
50-40-98-01508	Terrace with basalt flake scatter	Habitation	Pre-Contact	d	Data Recovery (Kaschko and Athens 1987)); Destroyed, No Further Work (Lee-Greig and Hammatt 2013)	Kaschko and Athens 1987; Athens 1991; Athens et al. 1992; Tomonari-Tuggle et al. 2000; Lee-Greig and Hammatt 2013
50-40-98-01509	Complex of 4 features (C-shapes, enclosures)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987
50-40-98-01512	Well	Water procurement	Post-Contact	d	Data Recovery	Kaschko and Athens 1987
50-40-98-01513	Complex (terrace, C-shapes, cairn)	Temporary Habitation, Marker	Pre-Contact	d	Data Recovery (Kaschko and Athens 1987); Preservation (Lee-Greig and Hammatt 2013)	Kaschko and Athens 1987; Lee-Greig and Hammatt 2013
50-40-98-01514	Complex of 3 features (walls, enclosure)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Athens et al. 1992;

Site Number	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
						Tomonari-Tuggle et al. 2000
50-40-98-01515	Rectangular walled structure	Habitation	Pre-Contact	d	Data Recovery (Kaschko and Athens 1987); Preservation (Lee-Greig and Hammatt 2013)	Kaschko and Athens 1987; Lee-Greig and Hammatt 2013
50-40-98-01516	Subsurface cultural deposit	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Kaschko 1991a
50-40-98-01517	Complex of 2 features (2 cairns, midden)	Ceremonial, habitation	Pre-Contact	d, e	Data Recovery	Kaschko and Athens 1987; Kaschko 1991a
50-40-98-01518	Complex of 3 features (petroglyph, pit, concentration of coral pebbles)	Art, military	Pre-Contact and post-Contact	d	Data Recovery	Kaschko and Athens 1987
50-40-98-01519	Complex of 3 features (terraces)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Kaschko 1991b
50-40-98-01520	Complex of 3 features (rock shelters, midden)	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987
50-40-98-01521	Paved area with midden scatter	Habitation	Pre-Contact	d	Data Recovery	Kaschko and Athens 1987; Kaschko 1991b
50-40-98-01522	Cattle chute and holding pen	Animal husbandry	Post-Contact	c, d	Preservation/Data Recovery (Kaschko and Athens 1987); Data Recovery (Kaschko 1991b)	Kaschko and Athens 1987; Kaschko 1991b
50-40-98-01523	Complex of 6 features (terrace, rock shelter, coral pebble/cobble concentration, concrete floor foundations, core-filled wall segment)	Habitation	Pre-Contact and post-Contact	d	Data Recovery (Kaschko and Athens 1987); Data Recovery (Kaschko 1991b); Preserved (Berrigan et al. 2008)	Kaschko and Athens 1987; Kaschko 1991b; Berrigan et al. 2008
50-40-98-01524	Mauka-makai ridgetop trail with associated shelter features (C-shapes, rock shelters,	Transportation, habitation, burial	Pre-Contact	c, d, e	Preservation/Data Recovery (Kaschko and Athens 1987); Burial Treatment Plan/ Preservation (Dye et al. 2013)	Kaschko and Athens 1987; Dye et al. 2013

Site Number	Type	Function	Age	Significance	Mitigation Recommendation	Reference(s)
	terraces, enclosure, platform)					
50-40-98-01525	Complex of 6 features (enclosures, terrace)	Habitation	Pre-Contact	c, d	Preservation/Data Recovery (Kaschko and Athens 1987); Monitoring/ Data Recovery (Berrigan et al. 2008); Preservation (Dye et al. 2013)	Kaschko and Athens 1987; Berrigan et al. 2008; Dye et al. 2013
50-40-98-01526	Complex of roadways and trails	Transportation	Post-Contact	c, d	Preservation/Data Recovery (Kaschko and Athens 1987); Data Recovery (Dye et al. 2013); Preservation (Lee-Greig and Hammatt 2013)	Kaschko and Athens 1987; Dye et al. 2013; Lee-Greig and Hammatt 2013

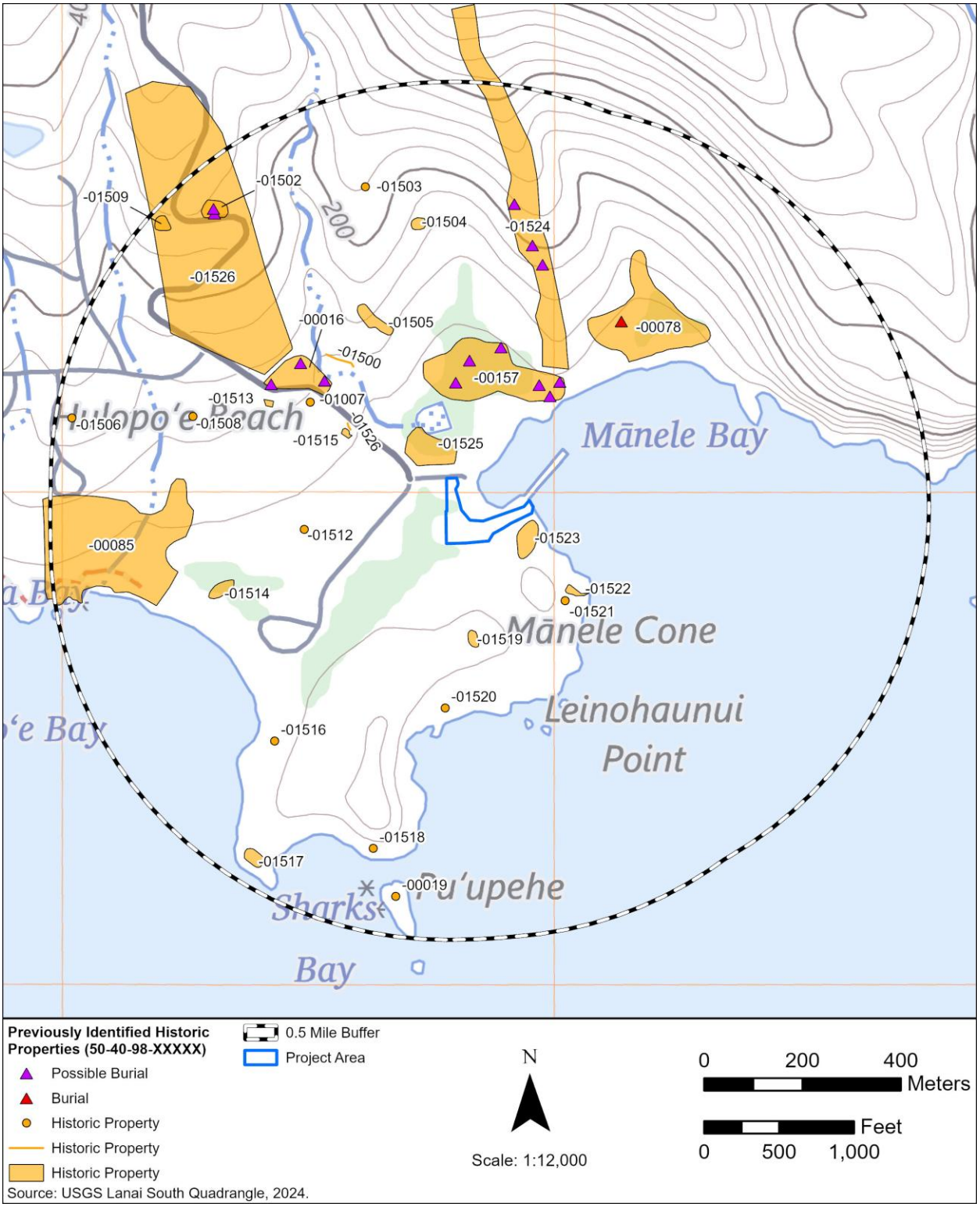


Figure 128. Previously identified historic properties within 0.5 miles of the Lānaʻi portion of the HIFL project area.

3.5.12 Summary of Archival and Background Research for the Lānaʻi Cable Landing Site

The project area lies within Mānele, located on the southern coastal end of Pālāwai Ahupuaʻa, one of four *ahupuaʻa* which cross over the top of the island of Lānaʻi to encompass portions of both its windward and leeward sides. Mānele translates to "sedan chair," and may be named for the Chiefess Kaʻuaʻumokuokamānele, daughter of Governor Kuakini. It is also said to be associated with passengers being carried up from their canoe landing to the dry shore. The *moʻolelo* connected to Puʻupehe, an islet off the shore of Pālāwai, recounts the love story of Puʻupehe, a daughter of a Maui Chief, and Makakehau, a warrior of Lānaʻi. The islet contains a small platform and low stone wall, where Puʻupehe was said to be buried by Makakehau after she drowned. The *moʻolelo* as recounted by Gibson also references a number of valued resources and cultural practices along the way. This includes: fishing for *kala* and *aku* in the clear waters of Kalulu; the cave of Malauea; the "great ravine" of Palawai and eating ʻ*uwaʻu* bird baked in *kī* leaf with sweet *pala* fern root and ʻ*ōhelo* berries; the cool waters of Maunalei; catching *ʻiʻiwi* and scarlet *ʻapapane* birds in the Pulou Ravine; the banana groves of Waiakeakua; baking *honu* in Malauea; and the burial area of Mānele. When Puʻupehe died, she was wrapped in bright *kapa* and adorned in *naʻu*. Another *moʻolelo* connected to Puʻupehe and related by Fornander referenced the shark Puaiki, who traveled between Papawai on Maui and Mānele.

The sheltered bay of Mānele, which provided abundant marine resources and a launch for travels to and from Lānaʻi, was a favored location and home to a permanent pre-Contact village. The gulch Kaupakuea is named for the thatched ridge poles of the many house sites that once populated Mānele, and the gulch was lined with house sites, terraces, enclosures, and mulch pits which likely grew a wide variety of crops including *kalo*, *ʻuala*, *niu*, *milo*, *noni*, *kou*, *hala*, and *wiliwili*. A number of pre-Contact trails ran along the shore and connected the coast to the uplands. As with many of the more recent roads on Lānaʻi, the road leading from Mānele Harbor to the uplands of Pālāwai was adapted from the pre-Contact trail system. The sand dunes extending behind Mānele are known to contain burials. They have also been home to indigenous seabirds like *ʻuaʻu kani*. Though there was limited freshwater on the coast, *kūpuna* (elders) knew how to dive into the nearshore waters to find freshwater sources that seeped from cracks in the rocks.

After Kalaniʻōpuʻu's forces were defeated on Maui Island, they settled on Lānaʻi for a time that proved highly destructive for the region. The war on Lānaʻi became known as '*Ka-moku-hi'*, or "the-land-of-loose-bowels," as the destruction of land and water drove people to eat the *kupala* root (*Sicyos pachycarpus*), known for loosening the bowels. The destruction wrought by Kalaniʻōpuʻu's forces evidently started a trend in population decline that Lānaʻi was never able to recover from. This also began a trajectory of deforestation, which not only removed lumber resources and native habitat, but also reduced Lānaʻi's groundwater resources. The 1804 arrival of foreign ships, and the foreign diseases they carried, continued the population devastation and by 1902, the native population had dropped from an estimated 6,000 people in 1793 to just 80. At the same time, the island saw large influxes of outside arrivals during the establishment of the Mormon mission and the Maunalei Sugar Company plantation.

Pālāwai Ahupuaʻa was awarded to Chiefess Kekauʻōnohi during the Māhele, and passed to her husband, Levi Haʻalelea, upon her death in 1851. A portion of LCA 10041, awarded to Kanekileia in the group claim under Lono et al. (Helu 10024 through 10058), lies within the project area. This parcel was known to contain a house site and sweet potato patch.

For better or worse, Walter Murray Gibson's arrival to Pālāwai was undoubtedly transformative to land use and tenure on Lānaʻi. Gibson arrived in 1861 to reinvigorate the Mormon mission that was first established in Pālāwai in 1853. During his short tenure as a Mormon missionary (Gibson was excommunicated in 1864), he managed to raise sufficient funds to purchase the entire *ahupuaʻa* of Pālāwai from Levi Haʻalelea in 1863, which he held in free title under his own name. Gibson would later entrust the family sheep ranch on Lānaʻi to his daughter Talula and move to Oʻahu to undertake political maneuvering that would help him consolidate control over more land on Lānaʻi. By 1875, Gibson had secured approximately nine-tenths of Lānaʻi Island through fee-simple titles or long-term leases. During Gibson's time, a boat landing was developed at Mānele and many existing pre-Contact foot paths were developed into formal roads, including one that led from Mānele to the uplands of Pālāwai. A large number of invasive mammals were introduced for Gibson's ranching efforts, and Maly (2013) estimated that by the 1890s, nearly 100,000 sheep and goats roamed Lānaʻi with minimal oversight.

In 1902, four years after Gibson's passing, his family sold the land to Charles Gay. Gay succeeded at consolidating nearly the entire island of Lānaʻi under a single, fee-simple owner, but became overstretched in the process and most of Lānaʻi was taken over by the Lanai Company, Ltd., who sold the lands to Frank and Harry Baldwin in 1917. After a failed ranching endeavor that introduced thousands of cattle to the islands, the Baldwins sold the lands to the Hawaiian Pineapple Company in 1922. The Hawaiian Pineapple Company continued cattle ranching alongside pineapple agriculture until 1951. During this time, the project area was located in ranch lands (Paddock 13). The final pineapple harvest on Lānaʻi occurred in November 1992.

The project area lies within Mānele Harbor, which was recognized by foreign arrivals as a key port location from the 1850s onward. A breakwater and boathouse were built in 1873. *Lele kawa* (cliff diving) was a favored activity in Mānele, especially from the cliffs on the southwest side of the coastline at Leinohaunui. In the 1920s, the Baldwin Ranch built a cattle chute near the Leinohaunui bluffs. Under the Hawaiian Pineapple Company, Mānele Landing was a popular hangout for plantation families. In the 1930s, mortar salt beds were added to the landing at Mānele, though they were moved to the cliffs above the landing in 1943.

Previously identified historic properties near the project area reflect both the intensive pre-Contact occupation of Mānele as a village and burial area, as well as post-Contact ranching activities. In 1964-65, bulldozing associated with the Mānele Small Boat Harbor Project impacted a number of significant archaeological sites and burials in and around the harbor area. Subsequent wharf development in 1971 also resulted in the destruction of a number of archaeological features.

3.6 HAWAIʻI ISLAND CABLE LANDING SITE

The Hawaiʻi Island portion of the HIFL project area is in the traditional *moku* (district) of Hilo, within the *ahupuaʻa* (traditional land division) of Waiākea. This *ahupuaʻa* follows the traditional *mauka* to *makai* (from the mountains to the sea) pattern, and extends from the slopes of Mauna Loa to the coastal waters of Hilo Bay. This overview of Waiākea Ahupuaʻa's history, with particular attention to Hilo Bay, Keaukaha, and the area around the UH Hilo campus, owes itself primarily to several previously published syntheses of the area. For more detailed information, the reader is referred to Akoi (1989), Inouye and Kormondy (2001), Kapuni-Reynolds (2024), Kelly et al. (1981), Maly (1996), and Maly and Maly (2022).

The cable landfall is located at the PACRC facility, which lies within the coastal area of Keaukaha, which Pukui et al. (1974) defined literally as "the passing current." Kapuni-Reynolds (2024) provided several alternate meanings for the name Keaukaha. For instance, the meaning provided by Edith Kanakaʻole is as a commemorative name from the Malo and Kahaʻawi families, from the time when ʻŌlelo Hawaiʻi became a written language. Found within the name Keaukaha are "place names related to drawing in the sand (Ke-one-kahakaha) and writing on the pahoehoe lava flats (Papa-kahakaha)" (Kapuni-Reynolds 2024:107). Another meaning for Keaukaha was provided by Joseph Kahaulopua Kekaualua, who said the name spoke to the rocky lands that were unsuitable for cultivation beyond sweet potato (Kapuni-Reynolds 2024). From the cable landfall location within Keaukaha, the project would utilize existing overhead utilities to connect with the CLS at UH Hilo, which is inland from Keaukaha and is also in the eastern portion of Waiākea Ahupuaʻa (Figure 129).

Hilo is a large area that encompasses the City of Hilo and larger surrounding district, as well as its bay and harbor. The name Hilo translates to "twist or braid," and can also mean "threadlike," or refer to a faint streak of light (Pukui and Elbert 1986). Hilo also refers to the first night of the new moon, and was the name of a famous Polynesian navigator whom Pukui and Elbert (1986) speculated may be the namesake of the city and district of Hilo. Pukui et al. (1974) identified three sections of Hilo town: "Hilo-one (sand Hilo), near the sea; Hilo-Hanakahi, an inland section toward Ke-au-kaha, named for a chief famous in song; and Hilo-pali-kū (Hilo of the upright cliff), east of the Wai-luku River" (Pukui et al. 1974:46).

Waiākea translates literally to "broad waters" (Pukui et al. 1974). Pukui and Elbert (1986) liken Waiākea to the *lehua keʻokeʻo*, a variety of *kalo* named for the flower of the *ʻōhiʻa* (*Metrosideros polymorpha*) tree, which is referred to as *waiākea* in Kona. Waiākea was also the home of ʻUlu, a man who died of starvation in and was buried near a running spring. The next morning, a breadfruit (*ʻulu*, *Artocarpus altilis*) tree full of fruit had sprouted there, ending the famine (Pukui et al. 1974:220).

3.6.1 Significant Place Names

A selection of place names associated with Waiākea Ahupuaʻa are listed in Table 20 and depicted in Figure 129 and Figure 130. Place names have been identified through Boundary Commission Testimonies, historic maps, and information received from CIA participants. Literal translations of place names have been added when they could be found in Pukui et al. (1974) or Pukui and Elbert (1986).

A number of significant place names along the Waiākea coast are mentioned in *He Mele no Beni P. Keola*, a *mele* (song) translated by Maly and Maly (2022):

He aloha o Leleiwi,	Love to Leleiwi,
Kela lae onioni,	That point which seems to move,
Lele mai o Waiuli,	Waiuli leaps about,
Me ka pua o ka hinano,	With the blossoms of the pandanus,
Kau pono I Keokea,	Keokea is set before,
Akea wale ka ikeʻna…	The expanse is seen…

(Maly and Maly 2022:24)

Nā Pana Kaulana o Keaukaha

In 1979, Edith Kanakaʻole composed the *mele*, "Nā Pana Kaulana o Keaukaha" (The Famed Places of Keaukaha), which takes the listener on a journey from Palekai to Leleiwi and recounts a number of significant places by name along the journey.

Na pana kēia o Keaukaha	These are the famed places of Keaukaha
Mai ka Palekai a i Leleiwi	From Palekai to Leleiwi
Pa mau i ka meheu a nā kupuna	Tread forever in the footsteps of the elder.
Haʻalele aku ʻoe i ka Palekai	We leave from Palekai
Kahi mākaʻikaʻi e nā sela moku	Where sailors go sightseeing
Lana mālie ke kai ʻolu nā lawaiʻa	The sea is calm; the fishermen enjoy themselves
Huli aku iā Puhi	Turn towards Puhi
Kahi pana heiau o ka manō niuhi	The famed temple site of the niuhi shark
ʻO Kulapae, pae i ke kula	Kulapae, come ashore on its plain.

(The first three verses of Nā Pana Kaulana o Keaukaha, as transcribed and translated by Kapuni-Reynolds 2024)

A 2011 *mele* composed by Halena Kapuni-Reynolds built on Edith Kanakaʻole's *mele*, focusing on six *wahi pana* (storied places) with particular significance to the Keaukaha community: Keaukaha, Puhi, Kulapae, Auwili, Keōkea, and Keonekahakaha:

Hoʻokūʻonoʻono ka ʻāina i nā Pulapula	The lands bring forth prosperity to the people
ʻĀina hoʻopulapula hoʻi o nā kupa, ʻo Keaukaha	(The) Hawaiian Homelands of the natives known as Keaukaha
ʻO Keaukaha ka home o Puhi,	Keaukaha is the home of Puhi
Kahi e lana ai ka wai, ka home ʻolu o ka ʻohana	Where the waters are still the pleasant home of the (Nawahī) ʻohana
Kahi e pae mai ai ka nalu	The place where the waves meet the shore
E māewa ai ka wainaku I ke kai piʻi i Kulapae	Where the wainakū grass sways rhythmically in the ocean during high tide at Kulapae

Pua‘i ka wai māpuna A wili ka wai au o waho, ‘o Auwili	The springwater bubbles forth Mixing with the waters of yonder, (at the place called) Auwili
A ma ka lihi kai, hō‘ea aku I Keōkea ‘O ke ōkea i kaulana i ka hala kea, i ka loko i‘a,	On the seashore, we arrive at Keōkea The sandy place that is famed for the white hala and the fishpond
I holo aku ka i‘a i kai ‘o Keonekahakaha, Kahakaha maila nā lima o kanaka ma ke one	The place where the fish swim in the sea, Keonekahakaha, where hands sketch in the sand
Aloha ‘ia nō ka ‘āina o nā Hawai‘I Ka ‘āina i pā mau nā mēheu o nā Kūpuna ‘O Keaukaha, ‘o Keaukaha nō ē!	Beloved are the lands of our people The lands that continue to bear the footprints of our ancestors (The lands) of Keaukaha indeed of Keaukaha!

(Kapuni-Reynolds and Waipā 2019:107-108)

In their *huaka‘i hele* (travels) of Keaukaha for the decolonial tour guide, *Detour*s (Aikau and Gonzalez 2019), Kapuni-Reynolds and Waipā elaborate on the longstanding significance and contemporary activities at the six *wahi pana* highlighted in this *mele*. They identify Puhi Bay, located on Hawaiian Homelands and under the jurisdiction of the Department of Hawaiian Home Lands (DHHL), as a *piko* (navel) of the community, and a place where many life milestones are celebrated and memorialized. Community elders took it upon themselves to clean up the area around Puhi Bay and turn it into the important community center it is today. A number of freshwater springs can be found along the bay, which have the effect of making the waters in this area cooler and less saline. The small *pu‘u* (hill) in Puhi was also once the home of Emma ‘A‘ima Nāwahī, called Wailana (calm waters), and a place where community elders would gather in the early 1900s to plan and fundraise for community improvements (Kapuni-Reynolds and Waipā 2019). Puhi was once famed for a blowhole, which was destroyed during the construction of the sewage treatment facility that was once there. A small islet overgrown with *hau* (*Hibiscus tileaceus*) that can be seen from Puhi Bay contains a feature that was described by Alfred Hudson as a burial vault, but is likely to be a *kū‘ula* fishing shrine (Kapuni-Reynolds 2024; and see Section 3.1.2). Further out from the islet is a shark hole where the shark Kaholeakāne, an *‘aumakua* (family god, deified ancestor) to some of the families in Keaukaha, lived.

Kulapae is an open field that was once a canoe landing site, and continues to be an important community gathering place. It is also known as “Hawaiian Village,” which refers back to the 1950s when thatch *hale* (house) were built here as an attraction and for community members to sell their arts and crafts to tourists. There was also once a large pavilion that hosted *lū‘au* (feasts). Although the thatched *hale* and pavilion are gone, Kulapae remains an active and significant community gathering place (Kapuni-Reynolds and Waipā 2019).

The warm waters of Auwili, a pond encircled by pāhoehoe lava that is filled with salt water from the ocean, contrast with the colder freshwater springs that characterize this coastal area and provide a safe place for children to learn how to swim. Nearby is a *pu‘u* with a small platform that used to be the home of the Kealohapau‘ole *‘ohana*, one of the families who lived in the area prior to the

establishment of the Keaukaha Homestead. The name Auwili is said to refer to the two currents that mix nearby (Kapuni-Reynolds and Waipā 2019).

Further from the project area is Keōkea, one of the few white sand beaches in the area. According to Kapuni-Reynolds and Waipā (2019:116), "the area was also known to produce white hala, though we do not know whether this refers to the kī (fruits) or the lau (leaves)." The swampy area around Keōkea is also notable as one of the few remaining habitats where the *nānaku* (native bulrush; *Schoenoplectus tabernaemontani*) thrives (Kapuni-Reynolds and Waipā 2019). Further still is Keonekahakaha (also called Onekahakaha), where children learned to write by drawing in the sand, and which is home to a *kupua honu* (supernatural sea turtle) that was cared for by the families that lived there in the past. This place was also briefly called Machida Beach, after Tomozo Machida who was granted a lease to land at Keonekahakaha from 1919-1920 (Kapuni-Reynolds 2024). In 1906, a Mormon church was the first church to be built in Keaukaha. Although the church is gone, the cemetery associated with it remains (Kapuni-Reynolds 2024).

The *huakaʻi hele* of Keaukaha is elaborated on further in Kapuni-Reynolds (2024), and provides additional insights into significant places in Keaukaha, some of which have been incorporated into Table 20.

Table 20. Place Names Associated with Waiākea Ahupuaʻa

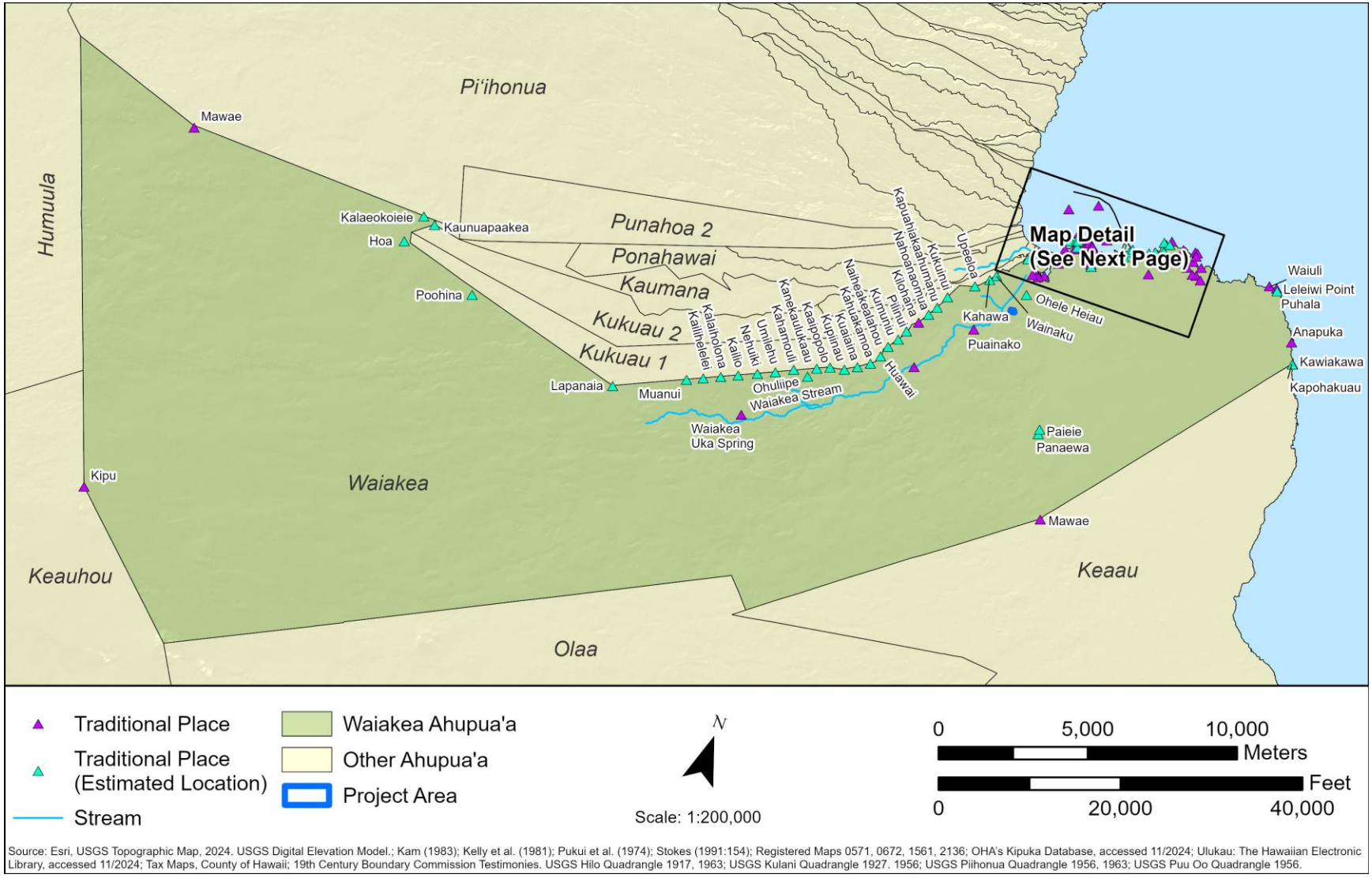
Place Name	Description	Map Source
Āhua	Surfing area located off Mokuola (Coconut Island); *lit.* "heap" (Pukui et al. 1974:6).	Soehren 2019
Ahuwela Point	Point.	Wall 1902 (RM 2136)
ʻAkahi Fishpond	Fishpond; *lit.* "one" (Pukui et al. 1974:8).	TMK 2-1-016 plat map
Anapuka	*Lit.* "Cave with holes"	USGS 1963c
ʻAuwili	Saltwater pond; *lit.* "the twisting currents."	Kapuni-Reynolds 2024, pers. comm. 2025; Kapuni-Reynolds and Waipā 2019
Awaau	Also called "Baby's Beach," as it is a good place to bring children to swim. There used to be a canoe landing here, though because of the channel, canoes could only land when the tides were high.	Kapuni-Reynolds 2024, pers. comm. 2025
Blonde Reef	Post-Contact name for the reef that separates Kuhio and Puhi Bay, named for George Anson Byron's ship the HMS *Blonde*, which returned the bodies of Kamehameha II and Queen Kamāmalu from England in 1824 (see "Byron Ledge" in Pukui et al. 1974).	USGS 1963c
Halaniani	Point.	Wall 1902 (RM 2136)
Hale o Lono	Fishpond. According to Pukui et al.: "In ancient times the rain was so heavy here that it washed away all the growing plants. The angry people caught some rain, put it in an oven, and saw it escape as a cloud at Puʻukapukapu" (Pukui et al. 1974:38).	TMK 2-1-015:042 plat map
Hale o Makua Point	Point.	Wall 1902 (RM 2136)
Hanalei Fishpond	Fishpond with a nearby stone wall which forms the boundary between Waiākea and Kukuau; *lit.* "Crescent bay" (Pukui et al. 1974:40).	(Alexander 1891) (RM 1561)
Hauiki	Sea area near the wharf; *lit.* "Small *hau* tree" (Pukui et al. 1974:42)	Soehren 2019
Hauna	Fishpond on the inner side of Lokowaka in Keaukaha; *lit.* "Fishy smell" (Pukui et al. 1974:42)	Soehren 2019
Hilo Bay	Bay, sometimes referred to as Byron's Bay or Waiākea Bay.	USGS 1963c
Hoa	Bird catching area near the boundary of Waiākea and Kukuau.	Soehren 2019
Hoakimau Pond	Pond.	Soehren 2019
Huawai	Bathing place at the boundary of Waiākea and Kukuau; *lit.* "Water gourd" (Pukui et al. 1974:52).	Soehren 2019
Kaʻāhelu	Point.	Wall 1902 (RM 2136)
Kaaipopolo	Boundary point where Pōpolo (glossy nightshade; *Solanum americanum*) grows between Waiakea and Kukuau; there is a forest where birds were caught on the Kukuau side.	Soehren 2019
Kahamouli	Boundary point.	Soehren 2019
Kahawa	An area with a lauhala grove on the boundary of Waiākea and Kukuau.	Soehren 2019
Kahuakamoa	Boundary point, perhaps translates to "cockfighting arena" (Soehren 2019).	Soehren 2019
Kailihelelei	Grove of koa trees where bird catchers would catch ʻōʻō (*Moho* sp.) on the boundary of Waiākea and Kukuau.	Soehren 2019

Place Name	Description	Map Source
Kaʻīlio	A canoe building spot where koa and ʻōhia grow together at the boundary of Waiākea and Kukuau; *lit.* "The dog" (Pukui et al. 1974:69).	Soehren 2019
Ka Lua Manō O Kaholeakāne	Shark hole. Home of the *ʻaumakua* Kaholeakāne.	Kapuni-Reynolds pers. comm. 2025
Kalaeokoieie	A *lae koa* that was mostly destroyed by the lava flow of 1855, and a boundary point which marks the end of Kaumana and the border between Piihonua and Waiākea.	Soehren 2019
Kalaiholona	A canoe building place at the boundary between Waiākea and Kukuau.	Soehren 2019
Kalanakama	Boundary point.	Soehren 2019
Kalauokukui Point/Reed's Landing	Point.	USGS 1963c
Kalepolepo	Fish ponds along the boundary of Piopio, an ʻ*ili kupono*; *lit.* "the dirt" (Pukui et al. 1974:76).	Alexander 1891 (RM 1561)
Kanākea Pond (Reed's Bay)	Pond named for the third child of Hina and Kūkaʻohiʻaālaka; *lit.* "wide stream" (Pukui et al. 1974:83). Other features associated with Kanākea include a rock known as the Tapa Anvil of Hina, and a large sinkhole at the center of the pond known as Kaluakoko.	Wall 1902 (RM 2136)
Kanāueue	Land section; *lit.* "The rotating" (Pukui et al. 1974:82).	Wall 1902 (RM 2136)
Kanekaulukaau	A planting place in the woods, near the boundary of Waiākea and Kukuau. Kanekaulukaau lies within Waiākea, and on the other side of the boundary in Kukuau is an adjoining planting place called Palaa.	Soehren 2019
Kanukuokamanu	A surfing area thought to be shaped like a bird's beak; *lit.* "The beak of the bird" (Pukui et al. 1974:85). The Hilo chiefs had a celebration at Kanukuokamanu on the night ʻUmi broke the *lei palaoa wiliwili* of Kulukuluʻa's daughter, precipitating the war between ʻUmi and the Hilo chiefs.	Soehren 2019
Kapalaho	Fishpond that marks the eastern boundary of Honohononui, an *ʻili kupono*.	Soehren 2019
Kapuahiakaahumanu	Boundary point.	Soehren 2019
Kaulaʻinaiwi Island	An islet beyond Mokuola where the bones of chiefs were dried. According to Thrum, "The northern part of Mokuola is known as Kaulainaiwi, being the place where the bones were placed to dry, or for airing" (Thrum 1907:56-57). L*it.* "dry the bones."	USGS 1963c
Kaunuapaakea	Boundary Point.	Soehren 2019
Kawiakawa	Cave. "They told me Kapohakuau, a large rock on the point at shore is the boundary between Waiākea and Keaau, thence *mauka* along Waiākea to Kawiakawaa, a small cave where natives worshipped idols" (Boundary Commission Testimony by Naipo, as quoted by Maly 1999:54).	Unknown n.d. (RM 0571)
Keaukaha	Hawaiian homestead area; *lit.* "The passing current" (Pukui et al. 1974:104), or "time (ke au) of writing (kaha)" (Kapuni-Reynolds and Waipā 2019). Other meanings for Keaukaha and an in-depth history of the Hawaiian Home Land community in Keaukaha can be found in Kapuni-Reynolds (2024).	USGS 1963c
Keekee	Fishpond	Wall 1902 (RM 2136)

Place Name	Description	Map Source
Keōkea	Point*; lit.* "The white sand" (Pukui et al. 1974:107). Another meaning is related to a gift of a light yellow *hala lei* called an *ō* (Kapuni-Reynolds 2024).	USGS 1963c
Keonekahakaha	Beach, also called Onekahakaha; *lit.* "drawing [pictures] in the sand"; place where children learned to write using the sand as their slate (Kapuni-Reynolds and Waipā 2019). Also called Machida Beach after Tomozo Machida, who leased land at Keonekahakaha from 1919-1929. After the lease expired, Keonekahakaha became a county beach park known as Onekahakaha (Kapuni-Reynolds 2024).	USGS 1963c
Kilohana	Hill and resting place at the boundary of Waiākea and Kukuau; Pukui et al. (1974) provide several translations for Kilohana, including "lookout point," "outer tapa," or "best, superior."	Unknown n.d. (RM 0672)
Kionakapahu	Pond.	TMK 2-1-016 plat map
Kīpū	Point; *lit.* "hold back" (Pukui et al. 1974:113).	USGS 1927
Kōwā	Channel between Hawai'i and Mokuola Island; *lit.* "channel" (Pukui et al. 1974:118).	Soehren 2019
Kuaiaina	Boundary point.	Soehren 2019
Kūhiō	Bay, named for Prince Jonah Kūhiō Kalaniana'ole.	USGS 1963c
Kuku Inui	Boundary point and *kahawai* surrounded by *kukui* trees; *lit.* "large candlenut" or "large light" (Pukui et al. 1974:122).	Soehren 2019
Kulapae	Open field and former canoe landing, also formerly Hawaiian Village; "wash up on the plains" (Akoi 1989).	Kapuni-Reynolds 2024, pers. comm. 2025
Kumu	A spring site on the bank of the Waiolama river where children used to enjoy diving and swimming, but is now filled in; *lit.* "source" (Pukui et al. 1974:124).	Alexander 1891 (RM 1561)
Kumuniu	The site of an old coconut tree that marked the boundary between Waiākea and Kukuau.	Soehren 2019
Kupiinau	Boundary point.	Soehren 2019
Lae Hala	Point.	TMK 2-1-015 plat map
Lae Kahaoi	Point.	TMK 2-1-015 plat map
Lae o Kahunakalahu	Point.	Wall 1902 (RM 2136)
Lae o Kaohe	Point.	Wall 1902 (RM 2136)
Lapanaia	Boundary point.	Soehren 2019
Leleiwi Point	Point, cape, and beach park. A *heiau ho'oulu i'a* called Pū-hala (pandanus tree) used to be located nearby. Pukui et al. (1974) translate leleiwi to literally mean "bone altar," a poetic expression that signals disaster or anger. According to Herring Kalua, Kamapua'a, Kamehameha, and many other chiefs traveled through Leleiwi along a trial from Puna to Waiākea (Akoi 1989).	USGS 1963c
Lokowaka	Pond named for the *mo'o* Waka who dove into it to escape Pele's jealousy. In 1912, Judge Wise identified Lokoaka as ideal location for the establishment of an oyster bed (*Hawaiian Gazette* 1912).	TMK 2-1-016 plat map
Mahikea	Islet.	USGS 1963

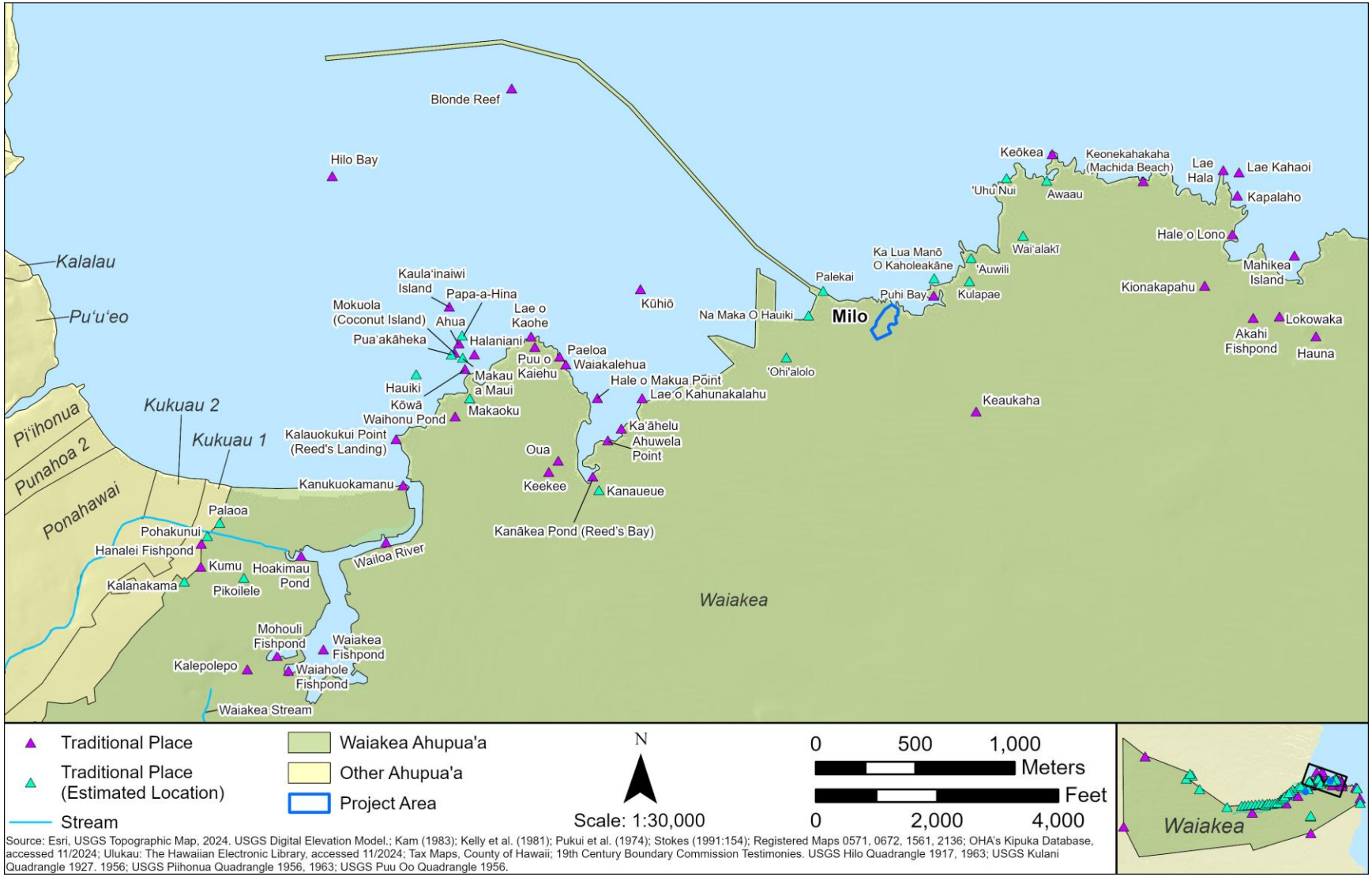
Place Name	Description	Map Source
Makaoku Heiau	Heiau. As described by Thrum: "On the shore opposite Cocoanut Island, Hilo, of luakini class, connected with the noted Mokuola place of refuge; dimensions unknown, though it is said to have had a high pyramid of stone as if for a place of observation. The stones of this heiau were taken by Capt. Spencer in the sixties for a boat landing" (Thrum 1907:40).	Alexander 1891 (RM 1561)
Makau a Maui	Name of a place on Mokuola; *lit.* "Maui's hook."	Soehren 2019
Māwae	Boundary point; *lit.* "cleft" (Pukui et al. 1974:150).	USGS 1956, Unknown n.d. (RM 0571)
Milo	Also referred to as Puuhomilo (Akoi 1989). A village site and the name for the area around the breakwater, including the Hawai`i Island portions of the HIFL project area . The area contains a hill fronting a tidepool, and is home to a supernatural *he'e*.	Brandt pers. comm. 2025; Kapuni-Reynolds 2024, pers. comm. 2025
Mohouli Fishpond	Pond.	USGS 1963c
Mokuola (Coconut Island)	Islet in Hilo Bay. According to Pukui et al. (1974), Mokuola was a son of 'Ulu. Thrum (1907) described Mokuola ('life island') as a puuhonua, or place of refuge. The islet was known for its spring water with healing properties. It was said that if people were sick, they could be cured if they dove down and swam around the rock three times (Neki Kauhi in Akoi 1989:53).	USGS 1963c
Muanui	Boundary point and bird catching place.	Soehren 2019
Nahoanaomua	Boundary point.	Soehren 2019
Naiheakealahou	Boundary point and the location of a graveyard and water well.	Soehren 2019
Na Maka O Hauiki	Two stone-lined pits in the water *makai* of 'Ohi'alolo, near Kuhio pier.	Kapuni-Reynolds 2024, pers. comm. 2025
Nehuiki	Boundary point and canoe building place where large koa grows.	Soehren 2019
Ohele Heiau	Heiau described by Thrum (1907) as a small, luakini class heiau which was destroyed.	Stokes 1991
'Ohi'alolo	An old place name that is now the location of Kūhiō Pier.	Kapuni-Reynolds 2024, pers. comm. 2025
Ohuliipe	Hill, and some say the location of a *heiau*.	Soehren 2019
Oua	Fishpond.	Wall 1902 (RM 2136)
Paeloa	Point.	Wall 1902 (RM 2136)
Paieie	Land near Pana'ewa. Pukui et al. (1974) translate to "*'ie'ie* vine enclosure," and provide the saying: *Luhe I ka wai o Pā-'ie'ie*, "drooping over the water of Pā-'ie'ie,", likens a drunk to drooping *'ie'ie* vines.	Soehren 2019
Palaoa	Boundary point; *lit.* "Whale" (Pukui et al. 1974:176).	Soehren 2019
Palekai	Edith Kanaka'ole's huaka'i through Kealakekua in "Nā Pana Kaulana o Keaukaha" begins in the west at Palekai, where the breakwater meets the shore and "where sailors go sightseeing / the sea is calm; the fishermen enjoy themselves" (Kanaka'ole in Kapuni-Reynolds 2024:85). The rocks for Palekai were brought from Kukuihaele and Puna via railroad. Palekai means "to break off the surf or the ocean or to stand off the ocean water that comes in" (Akoi 1989:5).	Kanaka'ole 1979 (in Kapuni-Reynolds 2024); Kapuni-Reynolds and Waipā 2019

Place Name	Description	Map Source
Panaewa	The legendary home of the *moʻo* destroyed by Hiʻiaka (Emerson 1915).	Soehren 2019
Papa-a-Hina	Flat stone on Mokuola where umbilical cords were hidden to protect them from rats; *lit.* "stratum of Hina."	Soehren 2019
Pikoilele	An old name for the area that is now the Villa Franca subdivision; *lit.* "flying tripping club" (Pukui et al. 1974:184).	Soehren 2019
Pilinui	Boundary point.	Soehren 2019
Pōhakunui	The southernmost of the Hālaʻi Hills, and where Maui took the secret of fire-making from the Alae birds; *lit.* "large stone" (Pukui et al. 1974:187).	Soehren 2019
Poohina	An old lava flow, later covered by the flow of 1852.	Soehren 2019
Puaʻakāheka	A sea pool to the right of the landing on Mokuola.	Soehren 2019
Puainako	The location of an unawarded claim by Kapuaakuni (no. 2274).	Soehren 2019
Pūhala	Fishing heiau; *lit.* "pandanus tree" (Pukui et al. 1974:192).	Pukui et al. 1974
Puhi Bay	Bay, and part of an old fishing village; *lit.* "blow" (Pukui et al. 1974:192)	USGS 1963c; Kapuni-Reynolds 2024, pers. comm. 2025
Puna Trail	Trail.	USGS 1917
Puu o Kaiehu	Puu.	Wall 1902 (RM 2136)
Puʻu ʻōʻō	Hills and trail; *lit.* "'ōʻō (Hawaiian honeyeater) hill" (Pukui et al. 1974:204).	USGS 1930
ʻUhu Nui	Location of a *heiau hoʻoulu iʻa* (a *heiau* where fish were offered to ensure good fishing; (Stokes 1991); *lit.* "large parrotfish."	Kapuni-Reynolds 2024, pers. comm. 2025
Umilehu	Boundary point.	Soehren 2019
Upeeloa	Boundary point with lauhala trees.	Soehren 2019
Waiāhole Fishpond	Fishpond; *lit.* "mature *āhole* (a fish) water" (Pukui et al. 1974:219).	Alexander 1891 (RM 1561)
Waiakalehua	Point.	Wall 1902 (RM 2136)
Waiākea Fishpond	Fishpond; *lit.* "broad waters" (Pukui et al. 1974:219).	USGS 1963c
Waiākea Stream	Stream.	USGS 1963c
Waiākea Uka Spring	Spring.	USGS 1963c
Waiʻalakī	Freshwater spring near ʻAuwili.	Kapuni-Reynolds 2024, pers. comm. 2025
Waihonu Pond	Pond.	USGS 1963c
Wailoa River	Estuary of Waiākea Stream; *lit.* "long water" (Pukui et al. 1974:224).	USGS 1963c
Wainaku	Boundary point and pool of standing water; *lit.* "pushing water" (Pukui et al. 1974:226).	Soehren 2019
Waiuli	Old surfing ground; "dark waters" (Akoi 1989).	TMK 2-1 plat map



Source: Esri, USGS Topographic Map, 2024. USGS Digital Elevation Model.; Kam (1983); Kelly et al. (1981); Pukui et al. (1974); Stokes (1991:154); Registered Maps 0571, 0672, 1561, 2136; OHA's Kipuka Database, accessed 11/2024; Ulukau: The Hawaiian Electronic Library, accessed 11/2024; Tax Maps, County of Hawaii; 19th Century Boundary Commission Testimonies. USGS Hilo Quadrangle 1917, 1963; USGS Kulani Quadrangle 1927. 1956; USGS Piihonua Quadrangle 1956, 1963; USGS Puu Oo Quadrangle 1956.

Figure 129. Traditional place names located in Waiākea Ahupuaʻa.



Source: Esri, USGS Topographic Map, 2024. USGS Digital Elevation Model.; Kam (1983); Kelly et al. (1981); Pukui et al. (1974); Stokes (1991:154); Registered Maps 0571, 0672, 1561, 2136; OHA's Kipuka Database, accessed 11/2024; Ulukau: The Hawaiian Electronic Library, accessed 11/2024; Tax Maps, County of Hawaii; 19th Century Boundary Commission Testimonies. USGS Hilo Quadrangle 1917, 1963; USGS Kulani Quadrangle 1927. 1956; USGS Piihonua Quadrangle 1956, 1963; USGS Puu Oo Quadrangle 1956.

Figure 130. Traditional place names located along the coast and near the PACRC portion of the HIFL project area.

3.6.2 Moʻolelo

Hilo is significant throughout Hawaiʻi's history as a major population center and royal residence. A selection of *moʻolelo* (oral traditions) pertaining to Hilo and Waiākea Ahupuaʻa are summarized here, with emphasis on regions near the project area.

Hiʻiakaikapoliopele

Many significant places of Waiākea Ahupuaʻa feature in the story of Hiʻiakaikapoliopele and her journey to retrieve the Kauaʻi chief, Lohiʻau, for her sister Pele. Excerpts here are from the English-language volume of Ka Moʻolelo o Hiʻiakaikapoliopele ("The Epic Tale of Hiʻiakaikapoliopele: Woman of the Sunrise, Lighting-Skirted Beauty of Halemaʻumaʻu"), originally written by Hoʻoulumāhiehie and published in *Ka Naʻi Aupuni* from 1905 to 1906 (Nogelmeier 2006).

When Hiʻiaka arrived at ʻŌlaʻa (Keaʻau), Wahineʻōmao asked Hiʻiaka how they would travel through to Waiākea: either to travel to Hāʻena, then on to Waiākea, or through the *lehua* (flower of the *ʻōhiʻa*) forest of Panaʻewa, where they would surely be killed by the *moʻo* (water spirit) guardian Panaʻewa. Hiʻiaka responded, "we shall take the path of death," and they continued on through the *lehua* groves of Panaʻewa (Nogelmeier 2006:51). When Hiʻiaka arrived at Panaʻewa, she chanted:

> Great Panaʻewa of the lehua groves
> ʻŌhiʻa that reach upward in spikes
> In the red lehua rain
> Grant us the pathway
> For me, indeed, Hiʻiakaikapoli
> Offer us welcome! Let us share our tears of joy.
> (Nogelmeier 2006:52)

Panaʻewa did not respond with a welcome, instead telling Hiʻiaka that there was no path through Panaʻewa for stone-eaters, and that she should have traveled seaward through Hāʻena. Hiʻiaka did not heed Panaʻewa's threats, and proceeded through the forest. Panaʻewa ordered her sentinels Kūkulukukui and Kapuakoaiʻa to sever the heads from the flying ghosts in Panaʻewa, so that their blood would flood Hiʻiaka's path. Hiʻiaka called to her siblings to help her, and they darkened the skies and sent storms and a raging flood to sweep Panaʻewa out to sea, to be swallowed by a large fish (Nogelmeier 2006).

They traveled on towards the shores of Waiākea. When they arrived at ʻOhele, they met Papanuioleka, who invited them to visit her home. Papanuioleka's father was fishing at Kalauokukui Point, but was not catching anything due to the storms from yesterday's battles. Hiʻiaka told him to go out and try again, as the sea surge would break apart the seaweed, and make it float on the surface and its smell would attract fish. This time, Papanuioleka returned with fresh-caught *uhu* (parrotfish; Scaridae) to prepare for her guests. After the meal, Hiʻiaka revealed her identity, and that they were traveling to the shore of Waiākea to continue on to Hilo. Papanuioleka asked to join them in their travels. Hiʻiaka warned her that it would be dangerous, and if she agreed to come along but then turned back, she would be beset by difficulty and tragedy. Papanuioleka insisted, and traveled with them to the Waiola River (Nogelmeier 2006).

When they reached the Waiola River, they removed their *kapa* (barkcloth) garments and jumped in the water to cross over. Hiʻiaka warned Papanuioleka, "As we all go along, if a man comes upon us

and his frayed loincloth is skewed, don't let that make you cut short your trip and go back, or you will betray your own words" (Nogelmeier 2006:70). However, this very thing came to pass and Papanuioleka turned to go home. When she got near her house, she was turned into *pāhoehoe* (smooth, ropy) lava. The shameless man who had caused Papanuioleka to turn around was also turned into stone, and still stands as a rocky outcrop called Paikaka (Nogelmeier 2006).

Maly and Maly (2022) related a mele*, He Moolelo No Hiiakaikapoliopele*, which documented Pele and her family's travels from Kahiki, and which mentioned Leleiwi:

Holomai Pele mai Kahikina	Pele traveled from the east
Kai a huakai mai Pele,	Pele's procession moved on,
A ka lae i Leleiwi,	At the point of Leleiwi,
Honi i ke ala o ka hala,	Was borne the fragrance of the pandanus,
O ka lehua o Mokaulele,	The lehua of Mokaulele,
Oia ka Pele a kui la…	That is what Pele made into a lei…
(Maly and Maly 2022:38)	

ʻUmi-a-Līloa

Many sources have offered an account of ʻUmi and his rise to power, most only varying in the finer details. A brief summary of this *moʻolelo*, specifically in relation to Hilo and Waiākea, is related here.

ʻUmi was the son of Līloa, a ruling chief who resided in Waipiʻo Valley, and a commoner woman from Kealakaha, ʻAkahi (Akahiakuleana; Fornander 1917c). When he was conceived, Līloa requested that if the child was a boy, he should be named ʻUmi, for his side of the family. He also left a number of chiefly tokens for ʻUmi, so that Līloa would recognize him as his son. According to Kamakau (1961), these included an *ʻahuʻula* (feather cape), *mahiole* (helmet), an ivory *niho palaoa* (whale tooth pendant), and a *kauila* (*Colubrina oppositifolia*) spear (Fornander (1917c) lists a loincloth, *lei niho palaoa*, and a war club).

ʻUmi traveled to Waipiʻo to meet his father, adopting three sons, or sworn companions, along the way who later became great warriors: ʻOmaʻokamau, Piʻimaiwaʻa, and Koʻi. After ʻUmi showed Līloa the gifts he had given to ʻAkahi, Līloa enthusiastically accepted ʻUmi as his son. Upon Līloa's death, Hakau was put in charge of the kingdom, while Līloa gave the temples and gods (the "government-snatching god," Kūkaʻilimoku) to ʻUmi, and instructed him to live humbly (Kamakau 1961).

Hakau was a good chief for some time; however, he soon fell back into his old ways and mistreated ʻUmi and his sons, so they fled to Hilo, and lived in the *ahupuaʻa* of Waipunalei near the boundary of Hāmākua (North Hilo). With the help of two high priests of Lono, who were themselves mistreated by Hakau and so conspired to betray him, ʻUmi and his adopted companions traveled through the mountains back to Waipiʻo, where they defeated Hakau, and ʻUmi became high chief. ʻUmi went on to conquer and unify the rest of Hawaiʻi Island under his rule. The next area to be conquered by ʻUmi was Hilo, then under the rule of the chief Kulukuluʻā.

Sometime after the events with his half-brother, ʻUmi and his companions travelled to Hilo incognito, though ʻUmi's "handsome appearance and fine physique" (Kamakau 1961:15) were recognized. There, he married the daughter of the chief Kulukuluʻa (his daughter's name is not given by either Fornander (1917c) or Kamakau (1961) and they lived together in Hilo. One night after a celebration at Kanukuokamanu, ʻUmi insulted his wife by breaking her *lei palaoa wiliwili*

(pendant made from the wood of a *wiliwili* [*Erythrina sandwicensis*] tree). This event precipitated the war between ʻUmi and the chiefs of Hilo. These events were described by Kamakau:

> ʻUmi dwelt with the daughter of Kulukuluʻa. She owned a necklace made of finely-braided dark hair with a pendant of wiliwili wood (lei palaoa wiliwili) fastened on securely. He saw it on the night when all of the Hilo chiefs had a celebration at Kanukuokamanu, Waiakea. There was hula dancing, games of hiding stones (papuhene), tossing a half-coconut at a mark (kilu), and loku [?] [in original]. ʻUmi saw the daughter of Kulukuluʻa adorned with birds' feathers on head and body, and about her neck was the necklace with the wiliwili pendant. After the celebration, ʻUmi's wife, daughter of Kulukuluʻa, went home. He asked her for the necklace and when she gave it to him, he said, "Is this your necklace of chieftainship?" The woman answered, "Yes, it is. Commoners are not allowed to wear one." [ʻUmi replied] "This is commonly worn by children and from them up to old women. The pendants (palaoa) of our chiefs are made of ivory, the teeth of whales. They are fastened to strands of braided hair." ʻUmi then broke her wiliwili pendant.
>
> ʻUmi-a-Liloa broke the tongue-shaped pendant of wiliwili wood, and when the daughter of Kulukuluʻa saw this she ran quickly to her father and said, "My husband broke my necklace in pieces." He asked, "Why did he break it?" His daughter answered, "The man said that he was ashamed of it, and that wiliwili pendants are worn by their commoners, from children to old women. The necklaces worn by their chiefs are made of the teeth of whales (niho kohola a me ka niho palaoa). Kulukuluʻa said to his daughter, "Have those men bound with ropes, and if the ivory palaoa of chieftainship is not produced, then they shall be slaughtered and offered as sacrifices in the heiau of Kanoa."
>
> Kulukuluʻa commanded his warriors to bind three of the men with ropes, ʻUmi-a-Liloa, ʻOmaʻo-kamau, and Koʻi. Piʻi-mai-waʻa was sent to Waipiʻo for the palaoa, because it was ordered that only one day be given to them to secure it, or else they should die. Piʻi-mai-waʻa ran and in a short time arrived at Waipiʻo and told the chiefs that ʻUmi and his companions were in trouble in Hilo. It did not take long for Piʻi-mai-waʻa, on that selfsame day, to return and give the ivory into the hands of Kulukuluʻa's daughter. She was beside herself with joy at the sight of this new object, an ivory pendant made of a whale's tooth and attached to a necklace. She leaped and laughed with glee over her luck, but ʻUmi-a-Liloa was sad at the thought of parting with the heirloom of this father Liloa. He uttered a prayer to his god, Kuʻkaʻili-moku to let the chiefs of Hilo take care of the palaoa of chieftainship, Nani-koki, until the day when they should become his captives.
>
> When the ivory was received, ʻUmi and his companions were freed from being held prisoners in the house of his parents-in-law. As soon as they were released in Hilo, ʻUmi and his companions returned to Hamakua and went down to Waipiʻo. There he conferred with his chiefs and his father's old war leaders. It was decided to make war on the chiefs of Hilo and to go without delay by way of Mauna Kea. From back of Kaʻumana they were to descend to Hilo. It was shorter to go by way of the mountain to the trail of Poliʻahu and Poliʻahu's spring at the top of Mauna Kea, and then down toward Hilo. It was an ancient trail used by those of Hamakua, Kohala, and Waimea to go to Hilo. They made ready to go with their fighting parties to Mauna Kea, descended back of Hilo, and encamped just above the stream of Waianuenue without the knowledge of Hilo's people that war was coming from the upland. Hilo's chiefs were unprepared. (Kamakau 1961:15-17)

ʻUmi was victorious and united Hilo and Hāmākua under his rule. The chiefs of Hilo were killed, though Kulukuluʻa's daughter was spared and the *palaoa* Nani-koki was restored.

Umi seized Puna from the chief Huaʻa, and Kaʻū from the blind chief Imaikalani. According to Kamakau (1961), ʻEhunuikaimalino was the chief of Kona from whom ʻUmi took control of Kona and Kohala, finally uniting the entire island under his rule.

After ʻUmi's death, the Kingdom of Hawaiʻi was divided between his two sons: Ke-liʻi-o-kaloa ruled in Kona, and Keawe-nui ruled in Hilo. According to Kamakau (1961), Keawe-nui:

> … was a kind ruler who looked after the welfare of chiefs and commoners, and increased the number of chiefly children. He sought out all the experts of the land, the kuhikuhi puʻuone, the readers of earthly omens and of heavenly omens, the skilled leaders of the kingdom, strong canoemen, navigators, canoe builders, those who could right upset canoes, expert war leaders, and all other skilled workers that were able to help in the affairs of the country. He was foremost in running the affairs of the government. (Kamakau 1961:34)

ʻUlu at Waiākea

Henry M. Lyman related a story of the "Deluge of Kahinalii," a great flood which brought destruction to Hawaiʻi as a consequence of the people neglecting the gods (Thrum 1923). After the deluge, the land was barren and all that was left to eat were foods from the ocean and "a kind of reddish clay which they mingled with *limu*" [seaweed] (Thrum 1923:235). In Waiākea, there was a man by the name of ʻUlu who had a son named Mokuola. The scant resources available during this time left Mokuola small and malnourished. Every day his father and mother worked as hard as they could to find nourishing food for Mokuola, but still he grew thinner and weaker.

Searching for answers, ʻUlu brought an offering of five fresh mullet wrapped in in *kī* (ti; *Cordyline fruticosa*) leaves to the *heiau* at Puueo. The answer he received at the temple was a voice from within its altar which said:

> The child of Kapapa was deformed; it had neither arms nor feet. She buried her infant by night at the end of the long house. In the morning there were stalks and leaves. Wakea came near and called it kalo. (Thrum 1923:238)

ʻUlu returned home and told his wife that he would die that night, and gave her instructions for what to do after he had passed:

> When the breath is all gone from my body, and my spirit has departed to the realms of Milu, carefully bury my head near the spring of running water. Plant my heart and entrails before the door of the house. My feet, my arms and legs, hide away in the same manner. Then lie down upon the couch where we two have so often reposed, and listen during the watches of the night; but go not forth before the sun has reddened in the morning sky. If, in the silence of the night, you shall hear sounds as of falling leaves and flowers, and afterward as of heavy fruit dropping to the ground, know then that my prayer has been granted, and that the life of our son shall be saved. (Thrum 1923:238-239)

After providing his instructions, ʻUlu died that night. His wife mourned his passing, and then did as he instructed, dividing his body with a bamboo knife and sharp shell. When her work was done, she returned to the house and laid down beside Mokuola to wait for results. The next day as promised, she began to hear the rustle of falling leaves, followed by the sound of ripe fruit dropping to the earth. When she went outside to look, she found the house now surrounded by vegetation. In the

spot where she buried her husband's heart now grew a breadfruit tree, which she called ʻUlu, after her husband. Where his head was buried near the spring of running water now grew bananas. Between those she found sugarcane and yams, and a variety of other edible roots and shrubs around the house.

Mokuola gathered the breadfruit and the bananas, and they roasted the food over the coals, reserving the best portion for the gods. After Mokuola began eating, his health returned and he became a renowned warrior. The name Mokuola was given to the islet where his bones were buried, and it is still called that today (Thrum 1923). Beckwith (1940) identified this *moʻolelo* as one of three origin stories for the breadfruit in Hawaiʻi.

Sharks in Puhi Bay

There is a well-known shark hole in Puhi Bay, beyond the *hau* islet, which is the home of the shark Kaholeakāne, an *ʻaumakua* to some of the families in Keaukaha. Kaholeakāne was known to warn fishermen of danger and to help fishermen whose canoes have overturned to get back to shore. In appreciation, they would offer food to the shark by casting it into the waters of the channels at Puhi (Hawaii Tribune-Herald 1926). Luka Kanakaole related a story about this shark:

> You know where cold pond is now in Puhi Bay. Well right on that hill used to be a house that we used as a club house. Across of that where the hau trees are now, used to be a heiau, an old Hawaiian fishing heiau. Just north of the heiau there is a shark hole. Everytime we used to go swimming or spear fishing, we would go and check the hole to see if the shark was in or not.
>
> If the hole was empty, then we wouldn't go swimming cause that would mean the shark was out looking for food. Certain times the shark would come back to its hole to rest. If it stopped flapping and the sand was settled, that would mean that it just came back. If the sand was not settled and the shark was still moving, that would mean that it would be going out again. When we knew that the shark had just come back from eating, we would go in the water. That was in 1930-1933 and I don't know if the hole is still there or not. William Spalding used to be the one crazy enough to go down first to take a look at the hole. (Luka Kanakaole in Akoi 1989:55-56)

On January 1, 1915, the *Hawaii Herald* published a story about two women, Elena and Kawaikuhea, who went to gather *ʻopihi* (limpets; Nacellidae) at Severance's Pond on Christmas Day. Severance Pond is located between Keōkea Point and Puhi. Kawaikuhea reached the rock ledge they were swimming out to first, and began to collect *ʻopihi*. Not long after, she heard Elena cry out:

> Auwe kuu make; aloha aku i kuu mau moopuna.
> (Oh, I am going to die; love to my grandchildren.)
> (Hawaii Herald 1915:1)

Elena was floating motionless in the water. Kawaikuhea cried out to her, but Elena did not move and did not speak. Elena was frozen and floating just above the shark hole. Even when the waves tossed Kawaikuhea, they had no effect on Elena. Kawaikuhea swam to Elena and tried as hard as she could to move Elena, but she would not budge. It appeared that she was being held onto by a "mysterious hand" (*Hawaii Herald* 1915:1). Kawaikuhea swam back to the rock and began waving to the people on the beach for help. Elena's husband saw people running on the beach and began to

realize someone was in trouble, and he swam into the see with several other men. Once he started towards the rock, Kawaikuhea told them to go after Elena. When Elena's husband talked to her, she remained frozen and did not answer. When her husband and the men with him tried to pull her, she did not move. Finally, her husband swam to shore again and gathered the roots of a a *pū hala* (pandanus; *Pandanus tectorius*). He swam to Elena and dove under her with the *pū hala*, which loosened the grasp of the mysterious hand and allowed Elena's husband and the others to move Elena to shore.

Once onshore, Elena still could not move or hear. Her husband carried her home, and after fifteen minutes there, Elena finally came back. In her statement, Elena said that when she was floating, it felt like someone was holding her around the waist, and she wanted to cry out, but could not (*Hawaii Herald* 1915:1). Kapuni-Reynolds (2024:127) posits: "This is one of the lessons of this story: do not swim right on top of the shark hole lest you want to be captured!"

Maly and Maly (2022) related a *moʻolelo* of the travels of Makanikeoe, which discusses a shark god named Kāneialehia, who guarded the ocean at Makaokū, Keaukaha, and Leleiwi. The *moʻolelo* is part of "He Moolelo Kaao Hawaii no Laukaieie" (A Hawaiian Tradition of Laukaieie), submitted to *Nupepa Ka Oiaio* by Moses Manu and published in 1894-95. Makanikeoe often used underground caves and tunnels to travel around Waiākea. One such path is described while Makanikeoe and his family were in Panaʻewa:

> Makanikeoe and family then disappeared, coming into the forest of Panaewa at the place Kahiolo, where are found two large openings to this day.
>
> The two openings are not deep in the earth like other pits, but the openings are joined together, and a person cannot enter to descend because there are cliffs on all sides. If one turns towards the makai side there is a third opening, and that is where a person may enter.
>
> There are three branches of this pit. The first runs straight down to Puhi, adjoining the place of waves at Milo. This is the branch that one travels to get the fresh water for these lands. The second branch comes out at the fishpond of Waiākea…The third of the branches in this pit runs to the uplands of Olaa. Its name is Kepuhi. This is a deep pit. (Manu in Maly and Maly 2022:42).

Kāneialehia is also mentioned in "He Moʻolelo Kaao Hawaii no Keliikau o Kau" (A Hawaiian Tradition of Keliikau o Kau), an incomplete story that does not resolve the ultimate fate of Kāneialehia. Notably, this story speaks to the lack of danger from sharks in this area: Kāneialehia had placed a strict *kapu* on his waters, and no native or visiting shark was allowed to bite a human. According to this story, Kāneialehia had a ward named Mikololou, to whom Kāneialehia granted "the ocean from Leleiwi to Keauhou, along with Hopie at Puna – including from Papai and Paukupahu, Papuaa, Haena, Paki, Aalamanu, and on to Keauhou" (Maly and Maly 2022:46-47). Mikololu was cared for by the people of this area and continued to maintain peace in his part of the ocean. However, some who kept Mikololou as a guardian began to send Mikololou to bite certain people. Mikololou was unable to keep this a secret from Kāneialehia, who took on his human form and traveled to Keaukaha to tell the families who cared for him that Mikololou was attacking people. They traveled to Papai to check on the fishermen there, and they saw that the fishermen would only fish from the rocky shoreline instead of on their canoes because of all the shark attacks. A large wave rose out of the ocean and Mikololou surfaced to grab one of the fishermen and pull him out to sea. The story ends with Kāneialehia swimming out to confront Mikololou, and one of

Kāneialehia's attendants taking up a net trap and snare and calling out to Mikololou, "Beware, the shark eats looking at the cliff base" (Maly and Maly 2022:47).

A version of this saying can be found in Pukui (1983:10):

> 64. ʻAi a manō, ʻaʻohe nānā i kumu pali.
> When the shark eats, he never troubles to look toward the foot of the cliff.
> Said of a person who eats voraciously with no thought of those who provided the food, shows no appreciation for what has been done for him, nor has a care for the morrow.

According to Edith Kanakaʻole, there were two white sharks in Puhi, and a family from Keaukaha who used to be related to the sharks. She described how the grandmother of the family would go to the *heiau* every morning to feed the shark. The shark was an *ʻaumakua* for the family, and it protected them whenever they were on the beach (Kanakaʻole in Akoi 1989). Kaimoon Calles likewise related being taught by his mother not to fear the sharks in Puhi Bay, and that there was always one shark that took care of the area from one end of the bay to the other. He similarly recalled giving the shark some of their fish (Calles in Akoi 1989).

The Heʻe at Milo

Edith Kanakaʻole recounted the story of a *heʻe* (octopus) known as a *kupua* (supernatural being which takes multiple forms) which lived at Milo (in Akoi 1989). Milo (or Puuhomilo) was a large hill on the side of an old trail, in front of her home in Keaukaha. Previously, the waters used to come up to Puuhomilo, and there was a tidepool that children used to swim in there. Any time more than ten children went to this place to swim, the *heʻe* would emerge and take one of the children. Eventually the people in the village asked the Kahuna about the children being taken. When he went to the tide pool early in the morning and saw a change in color in the ocean, he knew it was the *heʻe*, which are known to change color to disguise themselves. The Kahuna brought all the men of the village to the tide pool and they filled it with rocks. This trapped the *heʻe*, who was unable to get through all the boulders. Then they learned that when the children went to the tide pool to swim, they would disturb the *heʻe* in its home. If the children's feet touched one of the legs of the *heʻe*, this would upset him and he would take the child away (Kanakaʻole in Akoi 1989).

A different version of this story, which was related to Dean Lance Hauʻolikeola Pakele in the late 1980s, places the home of the *heʻe* on a rocky hill between Puhi and Milo (Kapuni-Reynolds 2024). The grandfather of one of the boys who had disappeared at this swimming pool went searching for him and found that there was a large octopus there. In this version of the story, it was an octopus woman who had snatched his grandchild to live with her. The grandfather had everyone in the village gather up firewood and place it into a big pile above the rocky hill where the *heʻe* lived. They set this pile on fire, and cooked the *heʻe* to death. After this, there were no problems swimming at Puhi (Kapuni-Reynolds 2024).

Kanakaʻole also recalled that there was another *kupua* in Keaukaha: a large white turtle at Keonekahakaha who was an *aumakua* for a kind and generous man who once lived at Keonekahakaha, and who made sure people were always provided for (Kanakaʻole in Akoi 1989).

Kaluakoko

At Kanākea Pond, also known as Reed's Bay or Reid's Bay, there was a hole known as Kaluakoko, or "the Hole of Blood" (Pukui and Green 1995). A *moʻolelo* related by Kaiama, a policeman who lived in Kanakea, in the early 1900s provides an explanation for how Kaluakoko got its name. There was once a fisherman and his wife who lived near Kanākea Pond, and the fisherman would go out in his canoe to fish. Over time, he came to know and care about another woman who lived in Keaukaha. His wife was not jealous of this, and instead insisted that he share some of his catch with the other woman. This went on for years until the fisherman and his wife agreed that the second wife should live together with them.

Unlike the fisherman's first wife, his second wife was jealous. She took care to hide her jealousy until one day when the fisherman left and told his wives not to go fishing until he returned. His second wife insisted they go fishing anyhow, and was so persistent that eventually the first wife conceded and they went to catch shrimp. The second wife waited until the first wife became preoccupied with fishing and neared the mouth of the hole, and shoved her into the hole and covered it with a large stone. The first wife could not escape and stayed in this hole until she died. The second wife returned home without shrimp and with a dry fishnet so that the fisherman would not suspect that she had left.

After his first wife died, blood seeped out of her mouth and into the sea foam, and traveled to where her husband had been fishing. The blood circled his canoe and made him think of his wife. He followed the trail of blood, which guided his canoe to the mouth of the hole. When the fisherman entered, he found the body of his dead wife there, which he carried back to his house and hid. When he confronted his second wife, she claimed that the first wife had gone off fishing without her and had not yet returned. The fisherman knew that she was lying and beat her to death. He buried his first wife in a cave and left the body of his second wife for her relatives, and never returned to this place. From then on, this hole was known as Kaluakoko (Pukui and Green 1995).

3.6.3 ʻŌlelo Noʻeau

Two of the *ʻōlelo noʻeau* compiled by Pukui (1983) make reference to Waiākea:

> 1773. Ke one ʻanapa o Waiolama.
> The sparkling sand of Waiolama.
> This is an expression much used in chants of Hilo, Hawaiʻi. Waiolama is a place between Waiakea and the town of Hilo. It was said to have sand that sparkled in the sunlight.
>
> 2901. Waiakea pepeiao pulu ʻaha.
> Waiakea of the ears that hold coconut-fiber snares.
> Snares for small fish, shrimp, or crabs were made of a coconut midrib and the fiber from the husk of the nut. When not in use the snare was sometimes placed behind the ear as one does a pencil. This saying is applied to one who will not heed—he uses his ears only to hold his snare.

Many more *ʻōlelo noʻeau* refer to Hilo more broadly, especially to its rains. Maly and Maly (2003:5) observed, "in the Hawaiian mind, the rains were god given, and manifestations of the gods Kane and Lono. Rains gave life to, and healed the land, thus a land of water was a rich one."

91. ʻAkāhi au a ʻike i ka ʻino o Hilo.
It is the first time I have seen a Hilo storm.
For the first time I have met with evil people who wish to harm me.

330. ʻEleʻele Hilo, panopano i ka ua.
Dark is Hilo, clouded with the rain.
Hilo is always rainy.

436. Halulu me he kapuaʻi kanaka la ka ua o Hilo.
The rain of Hilo makes a rumbling sound like the treading of feet.

448. Hana Hilo i ka poʻi a ka ua.
Hilo works on the lid of the rain.
Refers to the constant showers typical of Hilo district on Hawaiʻi. This is the first line of a chant.

462. Hana mao ʻole ka ua o Hilo.
Endlessly pours the rain of Hilo.
Said of anything that goes on and on, as the pouring rain, or of havoc such as that produced by a torrent. Names of other places are sometimes substituted for Hilo.

997. Hilo ʻai lūʻau.
Hilo, eater of taro greens.
The people of Hilo were said to be fond of cooked taro greens. When storms came to Hilo it was impossible to obtain fish from the streams or the sea. The people had to be content with taro greens.

998. Hilo ʻāina ua lokuloku.
Hilo of the pouring rain.

999. Hilo Hanakahi.
Hilo, land of Hanakahi.
Hanakahi was the name of a chief of Hilo in ancient times.

1000. Hilo i ka ua Kanilehua.
Hilo of the Kanilehua rains.
The Kanilehua rain, or the rain that patters in the lehua forest, is frequently referred to in the songs and chants of Hilo.

1001. Hilo i ka ua kinakinai, ka ua mao ʻole.
Hilo of the constant rain, where it never clears up.

1002. Hilo iki, pali ʻeleʻele.
Little Hilo of the dark cliffs.
Hilo-pali-ku, or Hilo-of-the-standing-cliffs, is always green because of the rain and mists.

1003. Hilo mahi haʻaheo.
Hilo of the proud farmers.
The climate makes the soil of Hilo very easy to till, so the farmers used to make a game of planting. They used long digging sticks to make the holes and wore lei to work. Working in unison, they made a handsome picture.

1004. Hilo, mai Mawae a ka pali o Maulua.
Hilo, from Mawae to the cliff of Maulua.

The extent of the Hilo district is from Mawae on the Puna side to Maulua on the Hāmākua side.

1005. Hilo, nahele paoa i ke ʻala.
Hilo, where the forest is imbued with fragrance.
Hilo's forest is fragrant with hala and lehua blossoms.

1006. Hilo paʻele ku.
Hilo is dark all over.
The rain, mist, and mud make Hilo dark.

1105. Hoʻonuʻa Hilo i ka lehua.
Hilo produces the lehua in abundance.

1245. Inu wai kōliʻuliʻu o Hilo.
Drink the waters of the distant sky in Hilo.
The rain of Hilo is a chief source of drinking water.

1551. Ka ua heʻe nehu o Hilo.
The nehu-producing rains of Hilo.
The people knew the season when the schools of nehu fish followed the rain.

1562. Ka ua Kanilehua o Hilo.
The Kanilehua rain of Hilo.
Hilo, where the rain moistens the lehua blossoms.

1607. Kau i ka lani ka holowaʻa ua o Hilo.
Placed high in heaven is the rain trough of Hilo.
An expression of admiration for a person of regal bearing.

1725. Ke kai kuaʻau lehua o Panaʻewa.
The sea where lehua fringes float about in the shallows.

1751. Ke koa ia e laumeki ai kahawai o Hilo.
That is the warrior who will dry the streams of Hilo.
A powerful warrior.

1926. Ku pāpū Hilo i ka ua.
Hilo stands directly in the path of the rain.

1969. Lei Hanakahi i ke ʻala me ke onaona o Panaʻewa.
Hanakahi is adorned with the fragrance and perfume of Panaʻewa.
The forest of Panaʻewa was famous for its maile vines and hala and lehua blossoms, well liked for making lei, so Hilo (Hanakahi) was said to be wreathed in fragrance.
2326. Noho maialile ka ua o Hilo, ʻelua wale no māua.
Keep your silence, o rain of Hilo, there are only two of us.
Uttered by Kanuha in retort when rebuked by the Reverend Titus Coan for Sabbath-breaking: "Hold your silence, for there are only two of us in authority" – meaning Kanuha and Governor Kuakini. Reverend Coan was not to give orders when either was present. Now it is used to mean, "Keep quiet, you're not the boss around here."

2609. Pau kea ho i ke kahawai lau o Hilo.
One's strength is exhausted in crossing the many streams of Hilo.

> Said of or by one who is very weary with effort. First uttered by Hiʻiaka in a chant when she found herself weary after a battle with the lizard god Panaʻewa.

3.6.4 Settlement and Land Use

Some evidence for late pre-Contact and early post-Contact land use can be derived from the writings of missionaries, explorers, and naturalists who observed cultural practices and cultivation strategies carried out as they likely had been for generations prior. For example, Boundary Commission testimonies from the mid-nineteenth century often described natural resources and land use activities occurring at this time, some of which likely extend back to early post-Contact or even pre-Contact era. These testimonies suggest Hilo Moku was an area of abundance, making frequent references to house sites and cultivation plots, and a wide variety of plants under cultivation, including *kalo* (taro; *Colocasia esculenta*), *uhi* (yam; *Dioscorea* sp.), *maiʻa* (banana; *Musa* sp.), *kī* (ti; *Cordyline fruticosa*), *māmaki* (Hawaiian nettle; *Pipturus albidus*), and *niu* (coconut; *Cocos nucifera*). References to streams, grottos, and waterholes, as well as shoreline access and canoe landings, reflect the abundant water resources in the area. Boundary Commission testimonies also indicated that bird hunting was carried out in the forests further inland at a place known as Kalapalapanui: "the boundary between Waiākea and Kaūmana runs mauka to Kalapalapanui, an ʻoiʻoina and place where we used to catch birds" (Boundary Commission testimony 1873, as quoted by (Maly and Maly 2003b:173). Late nineteenth-century maps of East Hawaiʻi continued to illustrate landmarks and resources of continued significance to traditional settlement and land use practices, including trails, fish ponds, and "Hala Woods" (Figure 131).

The first missionary to preach in Hilo was a Tahitian man named Auna, who arrived from Tahiti along with a delegation of missionaries from the London Missionary Society. Among this delegation was William Ellis, who stayed in Hawaiʻi from 1822-1824, and traveled the island to identify areas for prospective missionary stations. Ellis was taken with Hilo, and his account provides rich descriptions of the area during the early 1800s. While in Waiākea, Ellis stayed in "a comfortable house by the sea-side" which was provided by 'Maaro' (Maʻalo), the Chief of Waiākea (Ellis 1917:225). Ellis regarded Waiākea highly, describing the countryside as "the most beautiful we have yet seen" (Ellis 1917:252), "well watered, fertile and beautiful" and "having a commodious harbour" (Ellis 1917:12), despite—or perhaps because of—the dense fogs and heavy rains they experienced during their visit. Ellis estimated the population of the Hilo Bay area to be roughly 2,000 people living in around 400 *lauhala* (hala leaf)-houses. He also remarked on the relative ease of access to timber forests in Waiākea. Ellis described the beauty and bounteous resources of the area further in his recommendation of Waiākea for a missionary station:

> The light and fertile soil is formed by decomposed lava, with a considerable portion of vegetable mould. The whole is covered with luxuriant vegetation, and the greater part of it formed into plantations, where plantains, bananas, sugar-cane, taro, potatoes, and melons, grow to the greatest perfection.
>
> Groves of cocoa-nut and breadfruit trees are seen in every direction loaded with fruit, or clothed with umbrageous foliage. The houses are mostly larger and better built than those of many districts through which we had passed. We thought the people generally industrious; for in several of the less fertile parts of the district we saw small pieces of lava thrown up in heaps, and potato vines growing very well in the midst of them, though we could scarcely perceive a particle of soil…

> …There are plenty of ducks in the ponds and streams, at a short distance from the sea, and several large ponds or lakes literally swarm with fish, principally of the mullet kind. The fish in these ponds belong to the king and chiefs, and are tabued from the common people.
>
> Along the stone walls which partly encircle these ponds, we saw a number of small huts, where the persons reside who have the care of the fish, and are obliged frequently to feed them with a small kind of muscle [sic], which they procure in the sands round the bay. (Ellis 1917:252)

Kapuni-Reynolds (2019) argued that although outsiders have previously described the Keaukaha region as barren and inhospitable, the *moʻolelo* and lived experiences of elders prove Keaukaha to be rich in natural and cultural resources. These stories speak to the abundance of food produced in Keaukaha, gathering *limu* on the coast, and catching *ʻōhua* (baby fish) in the mornings. Indeed, the area was once known as *ʻĀina hoʻokūʻonoʻono*, or "lands that did and still bring forth prosperity for those who live here" (Kapuni-Reynolds and Waipā 2019:111). Akoi (1989) mentioned *limu huluhuluwaena* (red algae; *Grateloupia filicina*), an important ingredient in the raw liver delicacy *ake*, grew around Reed's Bay, but mostly disappeared after the 1946 tidal wave.

Fishing has always been an integral part of life in Hilo Bay. This included intense fishing for *aku* (skipjack tuna; *Katsuwonus pelamis*) and *ʻōpelu* (mackerel scad; *Decapterus macarellus*). Prior to the overthrow of the *kapu* (sacred, taboo) system (traditional Hawaiian religion) in 1819, there were seasonal *kapu* on these two fish associated with the *moʻolelo* of Pili Kaʻaiea. For six months out of the year, the *aku* was *kapu* and could not be fished for. For the other six months, the *ʻōpelu* were *kapu* and could not be fished for. The *aku* were taken by hook, and when chiefs went sport fishing for *aku* and *ahi* (various tuna fishes; Scombridae), they would bring lures made from mother-of-pearl shell to catch the *aku*. *Hukilau* (fishing with a seine) was also practiced at Hilo Bay, and drew in fish like *akule* (bigeye scad; *Selar crumenopthalmus*), *pāpio* (juvenile *ulua* [giant trevally]; *Caranx ignobilis*), *moi* (Pacific threadfin; *Polydactylus sexfilis*), *ʻamaʻama* (mullet; *Mugil cephalus*), *awa* (milkfish; *Chanos chanos*), and *ʻōiʻo* (bonefish; *Albula* sp.) (Kelly et al. 1981). Gathering shellfish and *limu* were also important practices. Marine invertebrates which could be found in Hilo Bay included sea urchins (*wana*), shrimp (*ʻōpae*), and various types of crabs (*kūhonu, ʻaʻama*, and *ʻalamihi*). At least three different types of *limu* were known to be available at Hilo Bay: *limu ʻeleʻele* (*Codium edule*) and *limu huluhuluwaena* (*Grateloupia filicina*), which grow best in quiet waters in the sand or mud or small stones, and *limu ʻakiʻaki* (*Gymnogongrus durvillei*), also known as *ʻopihi limu*, which can grow in more turbulent waters and requires a strong swimmer with a sharp tool to gather it. *Limu ʻakiʻaki* and *limu huluhuluwaena* used to grow in abundance around Reed's Bay before it was infilled with sand and turned into a residential area (Akoi 1989, Kelly et al. 1981).

Waiākea was home to abundant fishponds, which were stocked with *ʻamaʻama* (mullet; *Mugil cephalus*), *awa* (milkfish; *Chanos chanos*), *ahole* (Hawaiian flagtail; *Kuhlia* sp.), and *ʻoʻopu* (Hawaiian freshwater goby; *Lentipes concolor*). Some of these ponds were known as the "Royal Ponds," and during the Kamehameha Dynasty the mullet in these ponds were reserved for the King. During Commander Charles Wilkes' time in Hilo with the United States Exploring Expedition, he observed "the royal fish-ponds, from which, during my stay at Hilo, by order of the king, my table was constantly supplied with the fine fresh-water mullet that had been taken from the sea when small, as before described" (Wilkes 1845:125).

The fishpond ecosystems also supported many avifaunal species which are no longer present in the bay, which included the endemic Hawaiian duck (*koloa maoli*; *Anas wyvilliana*), coot (*ʻalae keʻokeʻo*; *Fulica alai*), and stilt (*kukuluāeʻo*; *Himantopus mexicanus knudseni*), and migratory pintail, widgeon,

and shoveler ducks (Kelley et al. 1981). Wilkes (1845) described a method of catching ducks at the ponds:

> …a string is tied to a small stick two or three inches in length, and the other end to a stone of two or three pounds weight, which lies on the bottom of the pond. The stick, which floats on the surface, is baited with a small fish, which the duck pounces upon, and swallows; in attempting to fly away, the stick is crossed in the throat, so that the duck, who is unable to carry off the stone, is secured. (Wilkes 1845:126)

The *kipi* method of *kalo* planting was practiced in Hilo in the marshes and along some stream beds where it was not possible to make *loʻi* (taro pondfields). This method was described by Handy and Handy (1972) as follows:

> Bulrushes were trampled down into the mud until a heap rose about to the surface, then earth was thrown on until it rose well out of the water, the earth being obtained by digging a trench on the mauka or land side. A succession of these kipi patches looked like long islands divided by ditches. The taro was planted on these 'islands,' such varieties as did not rot when wet and that liked moisture. The taro plant grew from six to nine or more feet tall and the kalo (corm) itself was very big. (Handy and Handy 1972:102-103)

In addition to *kipi* planting, *kalo* were also planted in rock mounds:

> We are told that farther seaward in Waiakea taro is still grown by the ingenious method of heaping up stones around a taro huli which is submerged in water, and held upright by chunks of lava; the stones presumably accumulate refuse enough to nourish the taro, along with the food taken in by the roots from lava and water. (Handy and Handy 1972:539)

Hilo was also one of the primary areas for growing *ʻulu* on Hawaiʻi Island (Handy and Handy 1972).

Maly (1996) conducted archival research into the area known as Kāwili, which was described to Theodore Kelsey by the Reverent Henry Nālimu. The contemporary geographic marker for this area is Kāwili Street, which runs along the southern side of the UH Hilo campus. Kāwili was named for a particular technique for using lime to snare birds, which were taken for both feathers and food. Bananas were also plentiful in the area, and provided food for the *ʻōʻū* (endemic Hawaiian honeycreeper; *Psittorostra psittacea*). Maly translated Nālimu's descriptions of snaring birds using *kāwili kēpau*, or bird lime:

> The bird lime (kēpau) is made from the sap of the breadfruit. Cut the breadfruit bark and the white sap flows, and when the sap is dry, say in the evening, the sap is hardened. You go and gather the sap. When enough has been gathered, the sap can be made into bird lime. Then you go and gather some raw kukui, removing the shell, you keep its meat. Then you go and get the "clover" for making bird lime (ʻihi-ku-kēpau, the Nasturtium sarmentosum), it is a black pāʻihi, and you mix it with the raw kukui. Then you chew it, and the kukui and pāʻihi become slimy. This is to put into a wakue bark cloth (it is a tough piece), then the juice of the kkui and pāʻihi are squeezed into the ʻōpihi (shell), it is the "pot" for cooking the broth over the fire. When it starts to boil, the (ʻulu) gum is cut into small pieces and put in the juice of the kukui and pāʻihi so it can boil. Then get two coconut mid-ribs or perhaps little sticks to stir this boiling juice. This is how it is done until the juice is cooked and becomes the birdlime. It is then place [sic] into the empty ʻōpihi or a ti leaf, wrapped up in ti leaves. Kāwili is in the uplands adjoining Mokaulele. Then go to where there is low branching ʻōhiʻa (pulu ʻōhiʻa), where the pāhoehoe is below.

> You are below on the pāhoehoe, and you apply the birdlime around the lehua flowers. Now you kāwili (twist, i.e. apply) this bird lime in among three or four lehua flowers, then when a bird is stuck by one of the lehua that blossoms, you free it and it is caught. You then hide again among the low ʻōhiʻa branches (a place where the ʻōhiʻa tops droop down, that is the pulu ʻōhiʻa), and catch another bird. You squeeze the birds head and it is killed. It is placed into a bag. Returning (home) perhaps around three ʻo clock, there are many birds, perhaps forty, twenty, or thirty. Those small birds; when fat---the meat is tasty and sweet. That's how one prepares kāwili kēpau, or bird lime to ensnare birds. (Maly 1996:7-8)

"Ka Uluwehi O Ke Kai" (Plants of the Sea) by Edith Kanakaole was inspired by Keaukaha, and going out in the early mornings with her children and grandchildren to gather resources from the ocean (Kapuni-Reynolds, personal communication 2025). The song speaks to the bounty of edible seaweeds just outside Kanakaole's house in Keaukaha:

He hoʻoheno kē ʻike aku	Such a delight to see
Ke kai moana nui lā	The great big ocean
Nui ke aloha e hiʻipoi nei	So familiar and very cherished
Me ke ʻala o ka līpoa	With its fragrance of the līpoa
He līpoa i pae i ke one	It is līpoa which was washed ashore
Ke one hinuhinu lā	Onto the shiny white sand
Wela I ka lā kē hehi aʻe	Hot from the heating sun as you step on it
Mai manaʻo he pono kēia	Don't think that this is fun
Hoʻokohukohu e ka limu kohu	How enticing is the display of limu kohu
Ke kau i luna ō nā moku la	Atop the rocks
ʻO ia moku ʻula la e hō	Enticing one to pick them
ʻOni ana i ʻōi ʻaneʻi	As they sway to and fro
Haʻina mai ka puana	Let the story be told
Ka līpoa me ka limu kohu	Of the līpoa and the limu kohu
Hoapili ʻoe me ka pāheʻe	Close companions of the pāheʻe
ʻAnoni me ka līpalu	Intermingled with the līpalu

(Ka Uluwehi O Ke Kai, written and translated by Edith Kanakaole, Huapala 1997)

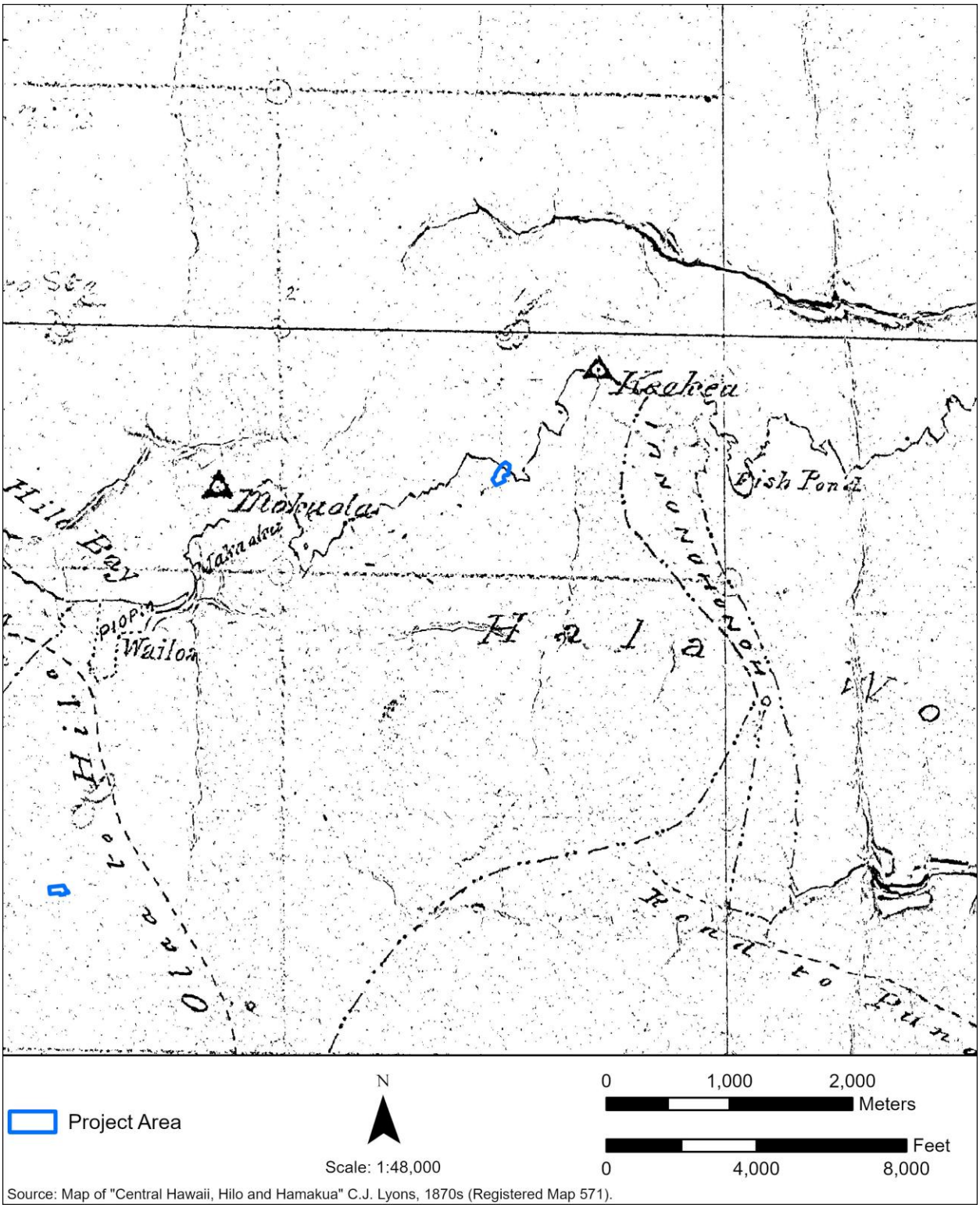


Figure 131. An 1870s map by Lyons showing significant place names and resources, including fishponds, trails, and the "hala woods" within Waiākea Ahupuaʻa.

3.6.5 Early Post-Contact Period

In the mid-18th century, Alapaʻi-nui united the island of Hawaiʻi under his rule. Kamakau (1961) wrote that Alapaʻi-nui was a good ruler, who treated the people well and honored his wives. He lived for some time in Hilo, until his conflict with Kalaniʻōpuʻu. After Kalaniʻōpuʻu claimed Kaʻu and Puna, Alapaʻi-nui lived for another year in Hilo and then moved to Waipiʻo. In 1782, Kīwalaʻō became *aliʻi nui* (high chief) of Hawaiʻi Island following the death of his father, Kalaniʻōpuʻu. Kīwalaʻō was given the island, while Kalaniʻōpuʻu's nephew Kamehameha was given the war god, Kūkāʻilimoku. After the death of Kīwalaʻō, Keawemaʻuhili ruled Hilo and Hāmākua from the court center of Hilo Bay, while Kēoua-kūʻahuʻula controlled Kaʻū, and Kamehameha had control of Kohala and Kona.

In 1790, Keawemaʻuhili was killed by Keoua after he heard how Kamehameha had incited war on Maui against the sons of Kahekili, and that Keawemaʻuhili had helped him. Kamehameha, who was living on Molokai at the time, returned to Hawaiʻi Island with his warriors to battle Keoua. The battle ended in stalemate, with both sides suffering great losses. Afterwards, Kamehameha went back to Waipiʻo and Kohala. Keoua returned to Hilo and "divided the land among his chiefs and warriors; the fat mullet of Waiakea and Piʻopiʻo became theirs" (Kamakau 1961:152). After this, Keoua and his army set out to return to Kaʻū. On their way, a volcanic eruption completely annihilated a portion of his army. The eruption lasted for days and killed many. Keoua was told by one of his seers that, "Hiʻiaka, his beloved, was angry at him for leaving Hilo, for she was enjoying the fat mullet of Waiakea" (Kamakau 1961:152).

By 1791, Kamehameha was in control of the entirety of Hawaiʻi Island, and was living in Hilo in 1794 when Captain George Vancouver attempted to land at Hilo Bay with the HMS *Discovery* and the *Chatham* (Kelly et al. 1981). Archibald Menzies, a naturalist aboard the HMS *Discovery*, described his view of Hilo Bay at the time of their arrival:

> Round the bottom of this bay was a track of low land that extended a considerable distance to the eastward and presented the most exuberant appearance, being well cultivated and adorned with beautiful groves of cocoa nut palms and bread fruit trees, amongst which were scattered the habitations of the natives. The whole was fertilized by two considerable streams of fresh water that emptied into the bottom of the bay. One we were told had seldom less depth than 8 or 9 feet water, though it was shallow at the entrance on account of the surf banking up the sand. (Menzies 1920:141)

In 1802, Kamehameha left from Hawaiʻi Island with a vast fleet of war canoes to conquer Kauaʻi. Kelley et al. (1981)remarked on the favorability of Hilo Bay for mounting this attack:

> The adzes of Mauna Kea and the large koa trees, olona, and other plant materials in the Lower Forest Zone back of Hilo Bay would make Hilo a most favored place for the construction and outfitting of such a fleet. At the bay the large expanse of beach gave ample space for the numerous canoe sheds (halau) needed for the finishing work and the housing of the canoes, and the sheltered waters of the bay provided an excellent staging area for the fleet. (Kelly et al. 1981:10)

Kelly et al. (1980) suggested the canoes built for this purpose may have become inter-island cargo ships following unification. After Kamehameha's passing, the majority of his lands in Hilo, including Waiākea, were inherited by Liholiho.

In the early 1800s, Hilo's forests and harbor likely made it an appealing location for the sandalwood trade. Ellis (1917) described taking a journey along the coast and encountering Waiākea's chief, Maaro [Maʻalo], bringing freshly harvested sandalwood to the beach to prepare for trade:

> During the same journey we overtook Maaro, the chief of Waiakea, and three or four hundred people, returning with sandal wood, which they had been cutting in the mountains. Each man carried two or three pieces, from four to six feet long, and about three inches in diameter. The bark and sap had been chipped off with small adzes, and the wood appeared lighter in colour than what is usually sold at Oahu, probably from its having been but recently cut down.
>
> …Although a plant of slow growth, it is found in abundance in all the mountainous parts of the Sandwich Islands, and is cut in great quantities by the natives, as it constitutes their principal article of exportation. (Ellis 1917:227)

In January of 1824, Joseph and Martha Goodrich and Samuel and Nancy Ruggles became the first missionary families to take up a station in Hilo, under the protection of the government (via Koahou, a representative of Kaʻahumanu). A *lauhala*-thatched dwelling house and meeting house were constructed at the station (roughly in the location where the former Hilo Iron Works was built many decades later), and the first Christian service was offered there on May 19, 1824 (Kelly et al. 1981). Missionary accounts have served as the primary source of English-language information regarding life in Hilo from the 1820s to the 1840s. Kelly et al. (1980) described the "Great Revival" of religious interest throughout Hawaiʻi, which began in Hilo with the Reverend Titus Coan in 1837. Most of the missionaries in Hilo remained only for a short period, and the legacies of Titus Coan and David Lyman are perhaps the most well remembered. According to Coan's accounts, the tsunami of 1837, which resulted in a number of casualties as well as significant damage to fish ponds and taro patches, was a significant contributor in conveying the power of God. Following the tsunami, the number of people eager to worship with Coan increased to 10,000 (Kelly et al. 1980). Lyman's primary contribution was towards the establishment of schools, including the Hilo Boarding School. An undated map by Lyons and Covington, made sometime following the establishment of the Waiakea Mill Company (1879), shows three major churches in Hilo Town: the Catholic Church, the "Foreign Church," and the "Puueo Church" (Figure 132).

In July of 1824, Liholiho (Kamehameha II) and his wife Kamāmalu contracted measles while visiting England, and passed away within days of each other while still overseas. Their bodies were returned to Hawaiʻi on the HMS *Blonde*, captained by George Anson Byron, who landed at Hilo Bay and subsequently traveled to Maui and Oʻahu. Byron returned to Hilo Bay in June with Kaʻahumanu, who declared that Hilo Bay should henceforth be known as Byron Bay, in commemoration of the first entry of a man-of-war ship into the bay. An 1825 map by Malden shows "Blonde Reef," likewise named after the ship that returned Liholiho and Kamāmalu to Hawaiʻi (Figure 133). Byron and his officers found the area of the Wailuku River immediately below the waterfalls to be a convenient watering place, and described watching people leap from the falls into the pools below (Kelly et al. 1981).

The first whaling ship on record to have visited Hilo Bay was the Partridge from London in October, 1824, with a small handful of whaling vessels visiting subsequently over the next several years. By 1828, whalers were regularly visiting Hilo, though likely never in the same volume as Honolulu and Lahaina, which were more popular whaling bays. This lack of popularity was apparently owing to the rainy weather and strong missionary presence in Hilo, which created a less entertaining environment for sailors (Kelly et al. 1980).

In 1828, Kauikeaouli (Kamehameha III) visited Hilo with his guardian Boki, but they were apparently poorly received:

> Here were Piʻopiʻo, his wife Maʻalo, and other chiefs, but they gave nothing but cooked food, held onto their lands, and did not offer them to the king as was the custom…Boki gave the district of Hilo to the king to divide among his followers and thus uphold his dignity at this place, but the other chiefs were not pleased at Boki's action. (Kamakau 1961:284)

Waiākea, which had been retained by Kamehameha and inherited by Liholiho, was held by Kaunuohua, granddaughter to Keawemauhili, at the time of the Māhele (Kelly et al. 1981).

While in Hilo to establish an observatory at Waiakea Point in 1840, Commander Charles Wilkes described the town and its surroundings as follows:

> Waiakea Point is situated on the opposite side of the bay from Hilo. The distance between them is a little more than a mile, and the path leads along a sandy beach, on which the surf continually breaks, and at times with great violence.
>
> Hilo is a straggling village, and is rendered almost invisible by the luxuriant growth of the sugar-cane, which the natives plant around their houses. A good road has been made through it for the extant of a mile, at one end of which the mission establishment is situated. This consists of several houses, most of which are of modern style, covered with zinc and shingles…
>
> The whole settlement forms a pretty cluster; the paths and road-sides are planted with pine-apples; the soil is deep and fertile, and through an excess of moisture, yields a rank vegetation.
>
> The church is of mammoth dimensions, and will, it is said, accommodate as many as seven thousand persons. It is now rapidly falling into decay, and another is in progress of erection. Many of the native houses are surrounded with bread-fruit and cocoa-nut trees, and have a fine view of the bay. (Wilkes 1845:123)

An 1841 map by Wilkes shows the Hawaiʻi Island portions of the HIFL project area within Waiākea Harbor, with the observatory on the coast to the west (Figure 134).

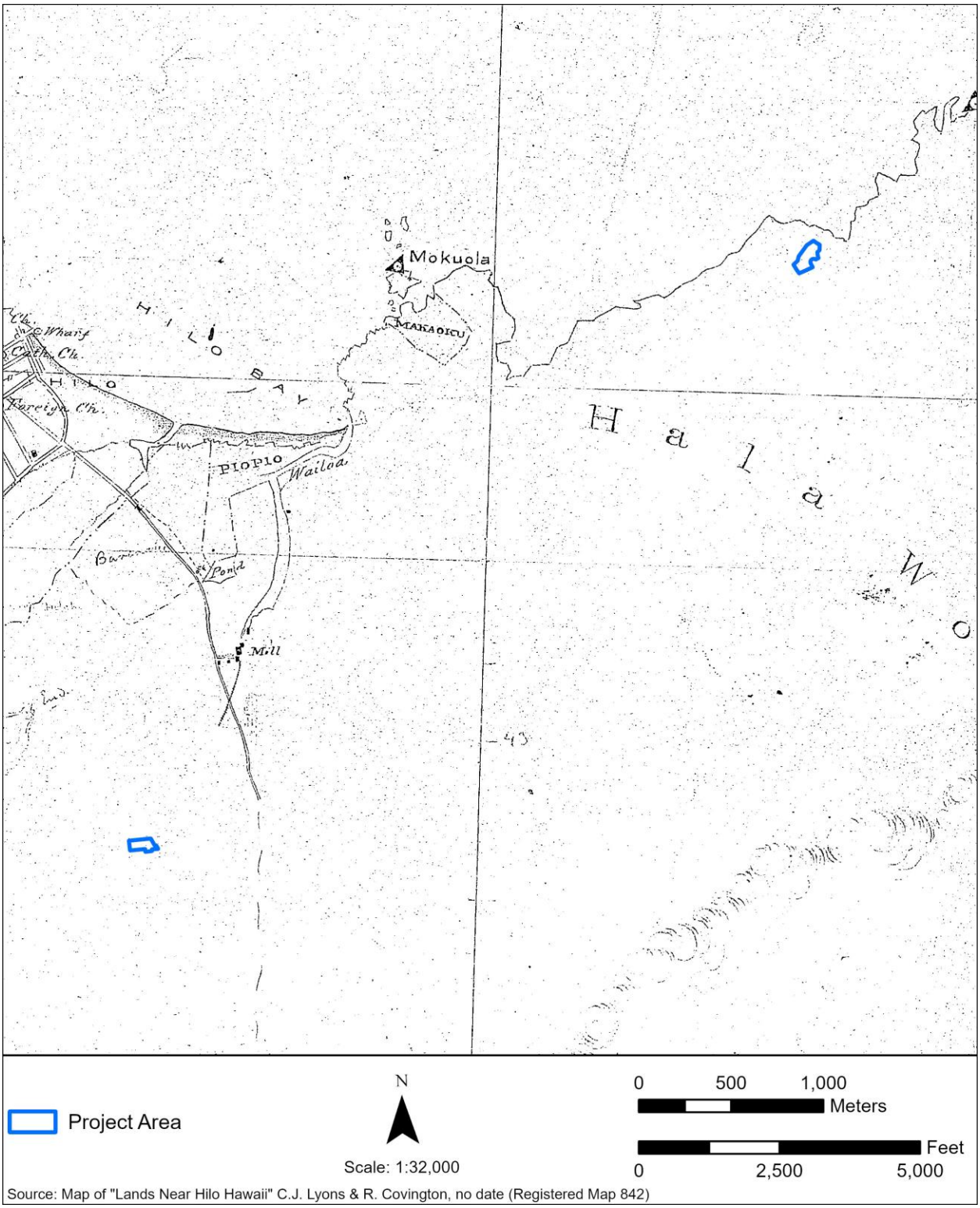


Figure 132. Undated map by Lyons and Covington, showing various churches and other developments around Hilo Town. The presence of the "Mill" indicates the map postdates the establishment of the Waiakea Mill Company in 1879.

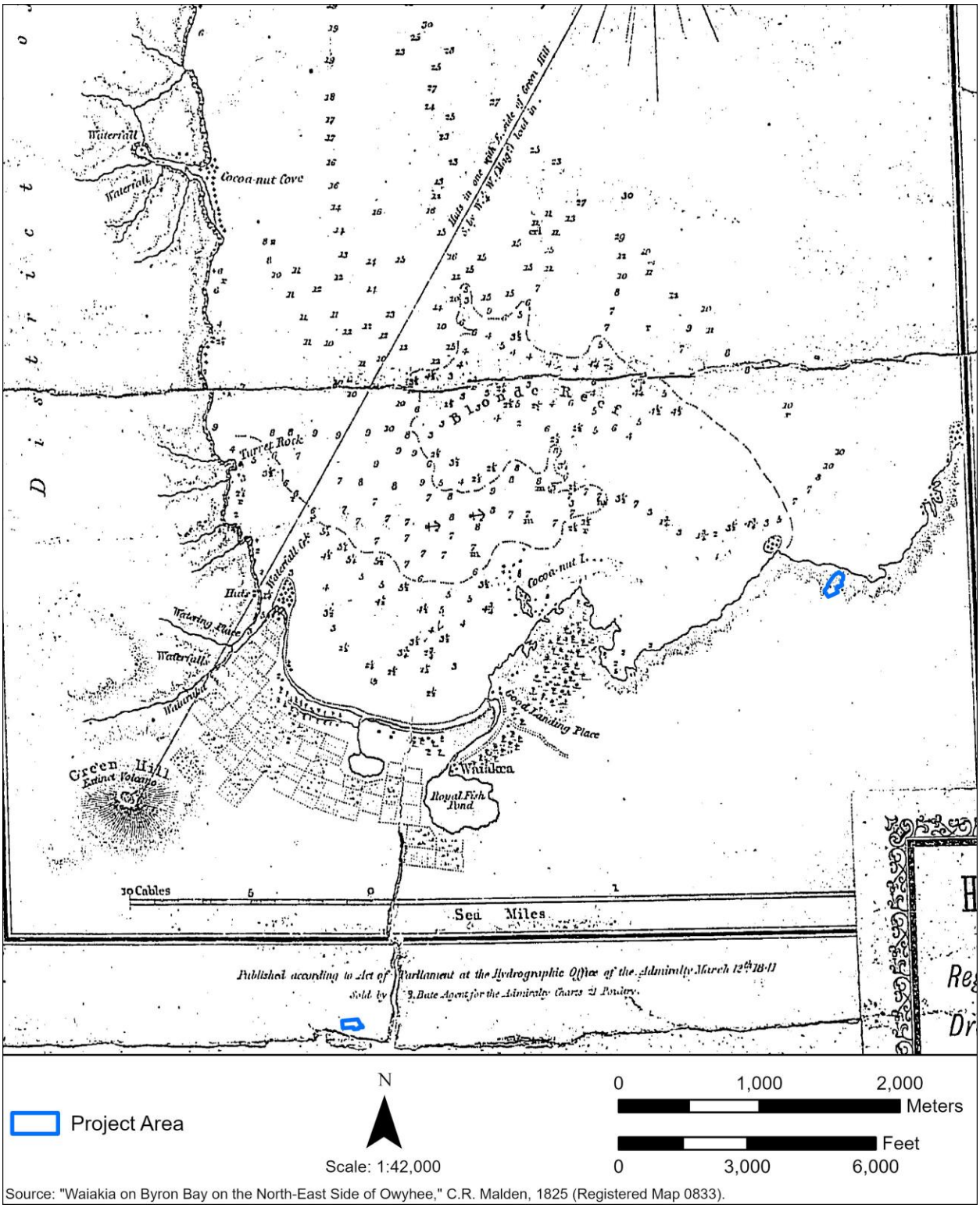


Figure 133. An 1825 map by Malden showing the recently re-named "Blonde Reef," and the developing Hilo Town.

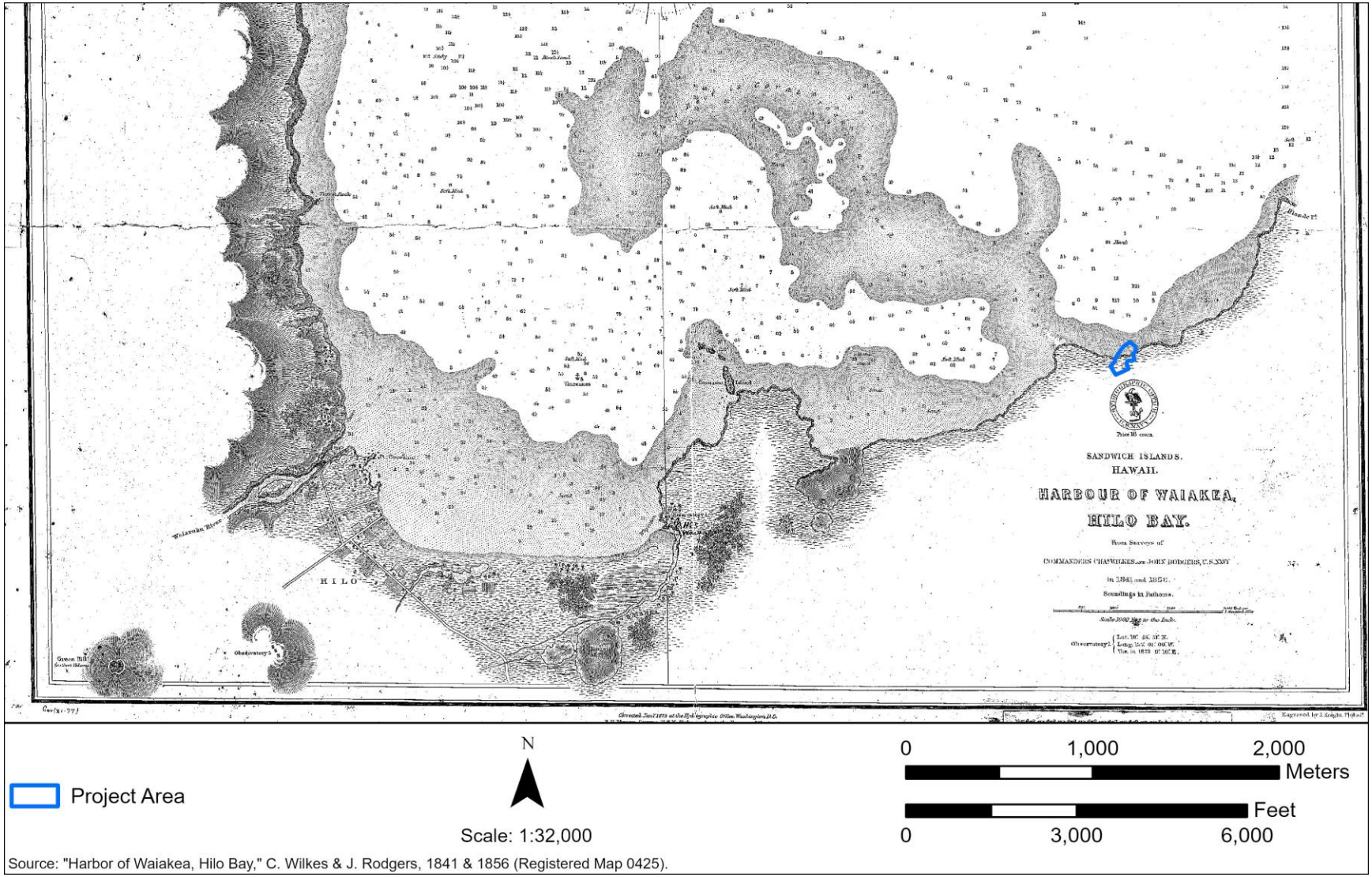


Figure 134. An 1841 and 1856 map by Charles Wilkes showing Waiākea Harbor relative to the PACRC portion of the HIFL project area.

3.6.6 The Mahele

Prior to the Mahele, Waiākea Ahupuaʻa was retained by Kamehameha I as his personal lands, and was inherited by Liholiho upon Kamehameha I's passing. At the time of the Mahele, Waiākea was held by Kaunuohua, granddaughter to Keawemauhili. During the Mahele, Waiākea became crown lands (Kelly et al. 1981). There are a number of LCA awards in the coastal region of Waiākea Ahupuaʻa, though none are within the Hawaiʻi Island portions of the HIFL project area (Table 21, Figure 135). Kapuni-Reynolds (2024) mentioned a *kuleana* claim that was petitioned for by E. Kapaakiha in Puhi (Helu 8868), but this claim was not awarded. Maly (1996) suggested the reason for a lack of registered claims in the *mauka* regions of Waiākea Ahupuaʻa may be due to the Hawaiian population decline and consolidation of the community during this time.

Table 21. Land Claim Awards Associated with Waiākea Ahupuaʻa

Helu/Claim No.	Claimant	Description/Source
1E	Mahoe	A cultivated field in the ʻili Keawe Kapu (Maly and Maly 2022).
1F	Kapu	A cultivated field at Piopio (Maly and Maly 2022).
1279	L.K. Halai	Enclosed planting lot in the ʻili of Kolea (Maly and Maly 2022).
1333	Kalalo	A kihapai in the ʻili of Koloniho (Maly and Maly 2022).
1738	I. Kaluhikaua	A fenced and partly cultivated house lot bounded by the ʻili of Ohele to the north and a trail running along the river on the west (Maly and Maly 2022).
2281	J.B. Kaiana	A 10-acre parcel in the ʻili of Alenoho (Maly and Maly 2022).
2327 and 8696	Barenaba	A lot enclosed by a stone wall, with several houses in the ʻili of Kalihi. Bounded on one side by the trail that ascends to the volcano (Maly and Maly 2022).
2402	Keoniho and Kahue	"land with a grove of pandanus, some areas are pahoehoe, and some areas are aa. Also 2 kihapai for Keoniho and 3 for Kahue" (Maly and Maly 2022:70).
2603	Napeahi and Pikaka	House lot, "There are also properties in the ili of Kialoa (1), and in Kialoa (2). There is a kukui tree and an ulu tree. There are also 4 houses (Maly and Maly 2022:70-71).
2663	Kahue	Kīpuka Database
4004	Hale	Four kihapai and two houses in the ʻili of Hinaauauwai (Maly and Maly 2022).
4344	Kuaio	Partially enclosed lot with three houses in the ʻili of Kolea (Maly and Maly 2022).
4737	Moealoha	Kīpuka Database; house lots of varying sizes (Maly and Maly 2022).
4737 B	Wahino	Kīpuka Database; house lots of varying sizes (Maly and Maly 2022).
4738 B	Lolo	Kīpuka Database; house lots of varying sizes (Maly and Maly 2022).
4785	Nakai	"My little claim is in Waiākea. The majority of my land is pahoehoe, with only a little place suitable for kipohopoho (planting in mulched pits and holes). Where I may cultivate crops. On the pahoehoe I do hoopuepue (mound planting) with mulched debris and dirt, to get some crops to grow…The ili is Hanahana. On one side is Waiākea loko (fishpond), and on the Puna side is vacant land. There are 3 kipi kalo, a kihapai, and a house" (Maly and Maly 2022:71-72).
5018	Keawe	Parcel of pahoehoe and some cultivated land in the ʻili of Kuahua (Maly and Maly 2022).

Helu/Claim No.	Claimant	Description/Source
5157:1 and 2	Kuahopu	"In the ili of Piopio, there are several kihapai at various places. There are also six kipi planting sites in the fishpond" (Maly and Maly 2022:72).
7713	Victoria Kāmamalu	Kīpuka Database
8803	Kamanukaka	Three partially-cultivated kihapai in the ʻili of Piopio.
9982	Levi	Four separate kihapai and house parcels in the ʻili of Paeaahu (Maly and Maly 2022).
10004	Lonohoihilo / Wahinenohoihilo	Three kihapai and a house in the ʻili of Laeaahu/Paeaahu (Maly and Maly 2022).
11050 B:1 and 2	Kaihenui	Two parcels and two houses in the ʻili of Kolea (Maly and Maly 2022).
11173	Wahinealua	Piece of land in the ʻili of Alenoho (Maly and Maly 2022).
11174	Kealiko	Piece of land in the ʻili of Alenoho (Maly and Maly 2022).
Grant 112	Barenaba	Kīpuka Database

3.6.7 Commercial, Municipal, and Industrial Development in Hilo Bay

Figure 136 and Figure 137 show a selection of prominent features and landmarks that emerged during the post-Contact period in Waiākea Ahupuaʻa. These developments include infrastructure associated with sugarcane agriculture, land and sea transportation, and the Keaukaha-Panaewa Hawaiian Homesteads. This section provides an overview of the main commercial, municipal, and industrial developments in Waiākea, with subsequent sections providing greater detail on the Keaukaha-Panaewa Homesteads, Waiākea Mill Company, and development of the UH Hilo campus.

Sugarcane was cultivated by Native Hawaiians for centuries prior to Cook's arrival. The missionaries living in Hilo in the early 1800s also participated in small-scale sugarcane cultivation for their own use. By the time Wilkes arrived with the U.S. Exploring Expedition in 1840, there were established sugarcane plantations and sugar mills, including a sugar plantation near Hilo owned by Governor John Adams Kuakini. By the 1860s, foreign industrialists had taken over large areas of land around Hilo for commercial sugarcane agriculture, shipping sugar out from Hilo Bay. This accelerated further after the Reciprocity Treaty of 1876, which ensured duty-free sugar exports to the United States. In the 1860s, much of Waiākea was leased out for pasturage. It was not until the late 1870s that C.E. Richardson and W.H. Shipman began commercial sugarcane planting in Waiākea, which was processed at a mill established in conjunction with Theo H. Davies and Alexander Young. In 1880, there were nine different sugar plantations operating in the vicinity of Hilo, but by 1888, Davies and Young had leased the entirety of Waiākea's lands, outside of the fish ponds and fishery rights, for 30 years to operate the Waiākea Mill Company (1879-1947). By then, the only other sugar plantation in the Hilo area was the Hilo Sugar Company (1884-1976), incorporated by William G. Irwin and Claus Spreckels. These two would later be joined by the Hawaiʻi Mill, which was in operation from 1901 to 1920 (Kelly et al. 1980).

The 30-year lease of Waiākea for the operation of the Waiākea Mill Company expired in 1918, at which point the government was required to put some of the lands up to lease to homesteaders who were willing to grow sugarcane to be ground at Waiākea Mill. This resulted in roughly 700 acres of land divided into cane lots, with a cluster of house lots along Volcano Road. However, the model proved to be a disastrous failure, rife with litigation and weighing homesteaders down with

debt (Kelly et al. 1980). Section 3.6.9 provides a more detailed history of the Waiākea Mill Company.

The growth of the sugar industry through the first half of the 1900s necessitated improved overland and sea transport infrastructure. This included harbor facilities at Hilo Bay and the development of a railroad. In addition to the railroad, Waiākea Mill also used barges to transport sugar across Waiākea Fishpond to the docks. A lock at the fishpond wall separated the fishpond from Wailoa Stream to prevent fish from escaping the pond when the barge traveled through (Kelly et al. 1980).

The Hilo Railroad was in operation from 1899 to 1946. In 1899, the Hilo Railroad Company reached an agreement with the government that gave it the right to own and operate a railroad anywhere on Hawai'i Island, as well as to construct and operate wharfs, terminals, and waterworks. B.F. Dillingham, who had led the development of the Oahu Railway and Land Company (OR&L), was a major shareholder of the Hilo Railroad Company alongside Lorrin Thurston. Dillingham hoped to translate the success of the OR&L to Hilo. A 1901 map by Donn shows the early days of the Hilo Railroad in the midst of the sugar boom (Figure 138). By 1912, the railroad had expanded significantly, with multiple routes inland and along the coast (Figure 139). The railroad's success was bolstered by the construction of the Hilo Breakwater; however, a costly and ambitious plan to expand the railroad to the North Hilo, Hamakua, and Puna Districts eventually led to the Hilo Railroad Company's foreclosure in 1916. From 1916 to 1946, the railroad was operated by Hawaii Consolidated Railway, Ltd. In the early 1920s, the Hawaii Consolidated Railway suffered periodic damage to its infrastructure from storms and tidal waves, though not so significant as to ruin the business. However, the tidal wave that struck Hilo on April 1, 1946 destroyed the main railroad line, switching tracks, and seawall between Waiākea and Hilo, the drawbridge over the Wailoa River, the passenger depot at Hilo, and the steel bridge over the Wailuku River. The few years prior to the tidal wave had seen record earnings for Hawaii Consolidated Railway but, perhaps seeing the writing on the wall as trucks began to play an increasing role in sugar transport, shareholders voted to liquidate rather than repair the damage (Kelly et al. 1980)).

In the early days, ships would anchor in Hilo Bay and transport passengers and cargo onto the beach via small boats or canoes (Kelly et al. 1980). In 1861, a stone landing pier and warehouse were built between Reed's Landing and the mouth of the Wailoa River, reportedly with rocks that came from the *heiau* on Mokuola. These structures were destroyed by tsunami in 1877. In 1897, funds were appropriated to build a small boat landing, ship wharf, and breakwater. The wharf was completed in 1899, and a second wharf was built by the Hilo Railway Company to ship pineapples from the cannery in Hilo. There was also a warehouse at the wharf to hold coal and sugar. In 1908, construction of the breakwater began using stones sourced from the Waiakea and Puna quarries, which were hauled to the wharf via railroad. The original location of the breakwater was planned to be just east of Mokuola, but later modifications relocated the breakwater to its present location, further east. By 1910, steamers from neighbor islands, San Francisco, and New York were regularly stopping at Hilo. By 1912, the wharf built by the railroad had become dilapidated, and it was replaced by a government wharf located a mile east of Mokuola, which was named Kuhio Wharf. In the 1920s, the harbor was dredged and an area near the wharf was filled in to create a parking lot, house storage buildings, and extend the railroad. Some of the dredged material from the harbor infilled swampy areas of Waiākea and helped to build the airport runways and roads in Keaukaha. Construction of the breakwater was finally completed in 1929 (Akoi 1989). The Hilo breakwater sustained significant damage from the 1946 tidal wave, and it was estimated that 70-80% of the total length of the breakwater had been carried away. It was repaired at a cost of roughly $1.5

million, and did not sustain much damage from the 1960 tsunami. According to Kelly et al. (1980), the harbor facilities have remained roughly the same since their reconstruction after the tidal wave of 1946.

Although the pineapple industry did not reach the same levels of success as sugarcane cultivation, pineapples were still grown on a smaller scale in Waiākea Uka (upper Waiākea), including in the area around the old Waiakea Mill Camp 6. The old Hilo Pineapple Cannery was located near the Waiakea Mill, which later became the location of the Hilo Iron Works building (Maly 1996).

In 1932, a subsidiary of the Waiakea Mill Company (Hawaiian Cellulose Ltd.) began manufacturing canec, a type of wallboard produced from a sugarcane byproduct called bagasse. Production of canec was also conducted near the site of the Waiakea Mill. This continued into the 1960s, when a factory fire destroyed a large portion of the canec production facilities and the company was forced to sell. The manufacturing process required applications of highly toxic materials in order to stabilize the canec and make it resistant to termites. Toxic residues from this process, which include sodium aluminate, alum and ethyl silicate, calcium arsenic, and arsenic acid, were dumped in the Wailoa Estuary. These chemicals continue to impact the land and waters of the Wailoa-Waiākea Pond area today (Maly 1996).

In 1966, a municipal sewage system was developed for Hilo, which included the installation of a Hilo Sewage Treatment Plant in the current location of the PACRC facilities. This was intended as a 'first increment' for a regional system which would serve the whole population of the Hilo area. The outfall for the Hilo Sewage Treatment Plant was installed at Puhi Bay, near the breakwater and the PACRC portion of the HIFL project area, and likewise became operational in 1966. An aerial image from 1965 shows the project area just before the plant became operational (Figure 140). Initially, the outfall discharged effluent at a depth of roughly 37 feet. A few years later, this was extended to 4,500 feet offshore and discharged at a depth of 56 feet. The Final Environmental Assessment for the Hilo Wastewater Management Plan observed that the coastal waters from Pepeekeo Point to Leleiwi Point had become polluted from a variety of sources, including wastewater from sugarcane processing, the canec plant, surface runoff from agricultural lands, raw sewage discharges, periodic shipboard waste disposal in Hilo Harbor, cesspool overflow, and thermal discharges into Wailoa River by the Hilo Electric Company. In 1965, the State Department of Health prohibited the use of the Hilo Harbor waters for swimming, boating, or fishing. After the treatment plant was built, major raw sewage discharges into the bay had stopped and the water quality improved significantly around the harbor. The waters around the treatment plant at Puhi Bay, however, continued to receive the majority of remaining pollutants (M&E Pacific, Inc. 1980).

In 1993, a new wastewater treatment facility was built near the Hilo Airport, which rendered the operations at Puhi Bay obsolete. The original facility, now known as the Old Hilo Wastewater Treatment Plant, was decommissioned and abandoned except for a single pump station (Pua Street Pump Station). In 1998, the University of Hawai'i at Hilo proposed redeveloping the Old Hilo Wastewater Treatment Plant into the Pacific Aquaculture and Coastal Resources Center in support of UH Hilo's aquaculture and marine science programs (M&E Pacific, Inc. 1988). Work on the PACRC began in 2000, and facilities opened in 2005 (Smith 2004).

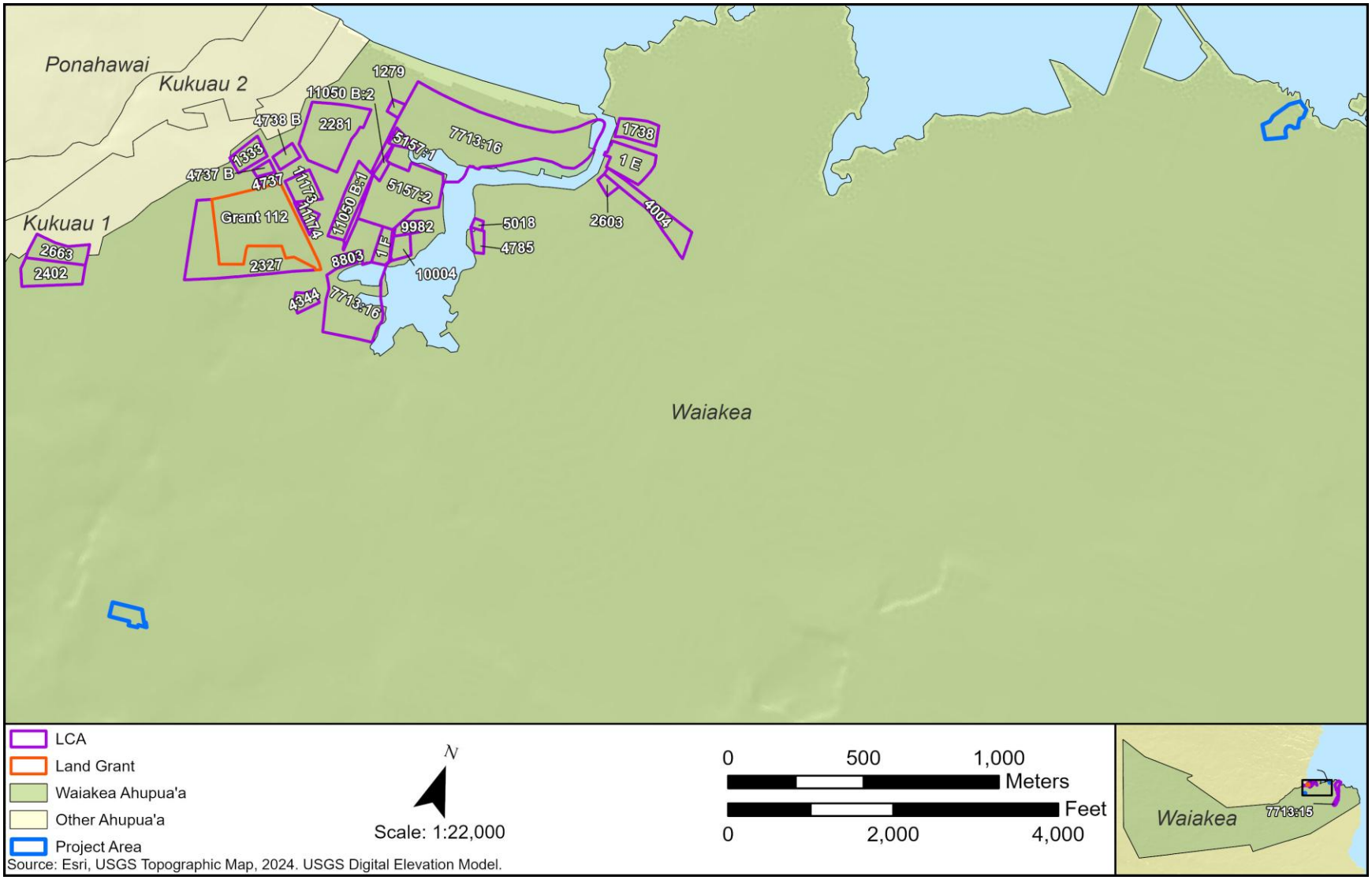
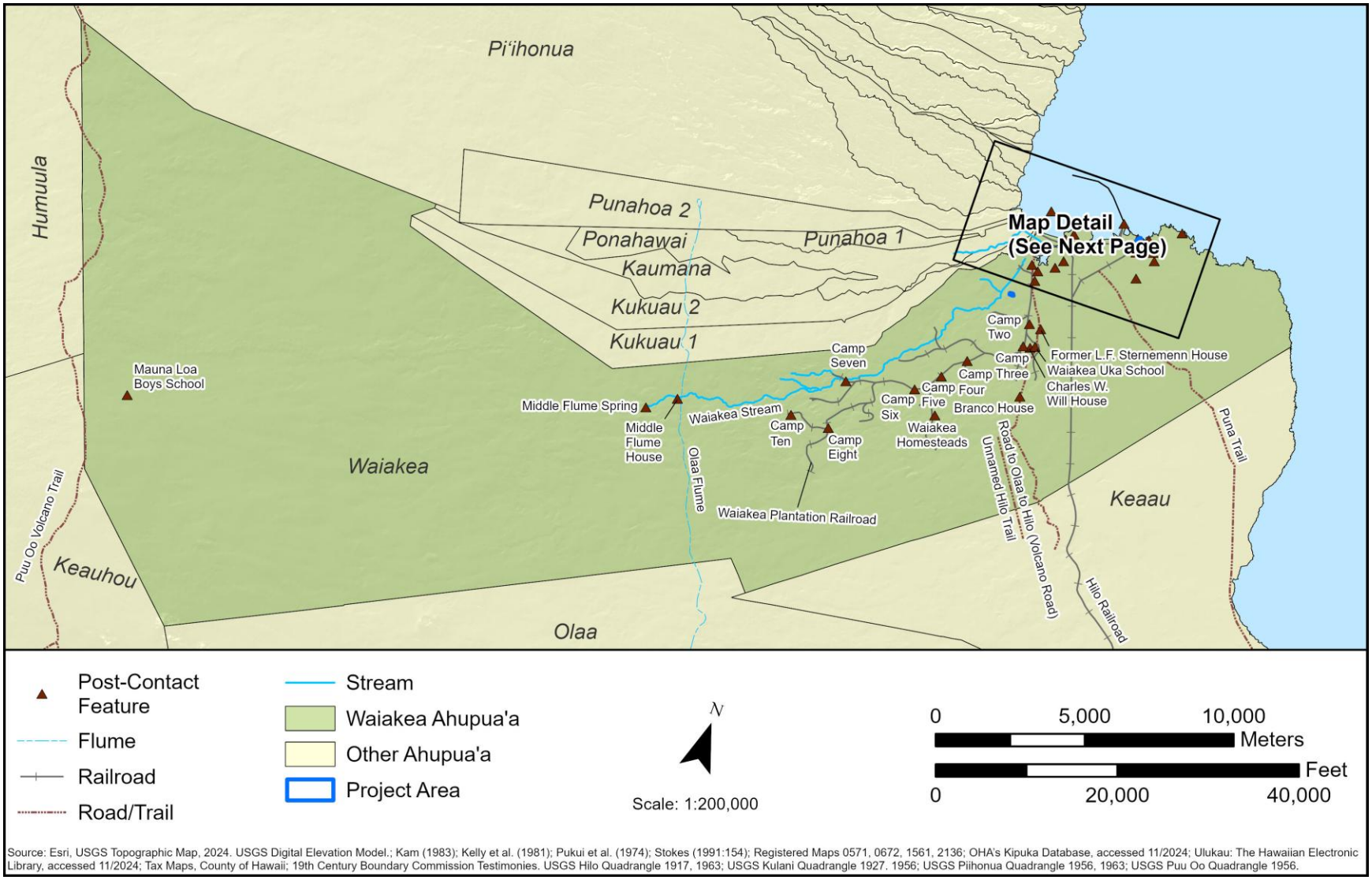


Figure 135. Map of LCAs and Land Grants in the vicinity of the Hawai'i Island portions of the HIFL project area in Waiākea Ahupua'a.



Source: Esri, USGS Topographic Map, 2024. USGS Digital Elevation Model.; Kam (1983); Kelly et al. (1981); Pukui et al. (1974); Stokes (1991:154); Registered Maps 0571, 0672, 1561, 2136; OHA's Kipuka Database, accessed 11/2024; Ulukau: The Hawaiian Electronic Library, accessed 11/2024; Tax Maps, County of Hawaii; 19th Century Boundary Commission Testimonies. USGS Hilo Quadrangle 1917, 1963; USGS Kulani Quadrangle 1927. 1956; USGS Piihonua Quadrangle 1956, 1963; USGS Puu Oo Quadrangle 1956.

Figure 136. Significant landmarks and features in post-Contact Waiākea Ahupuaʻa.

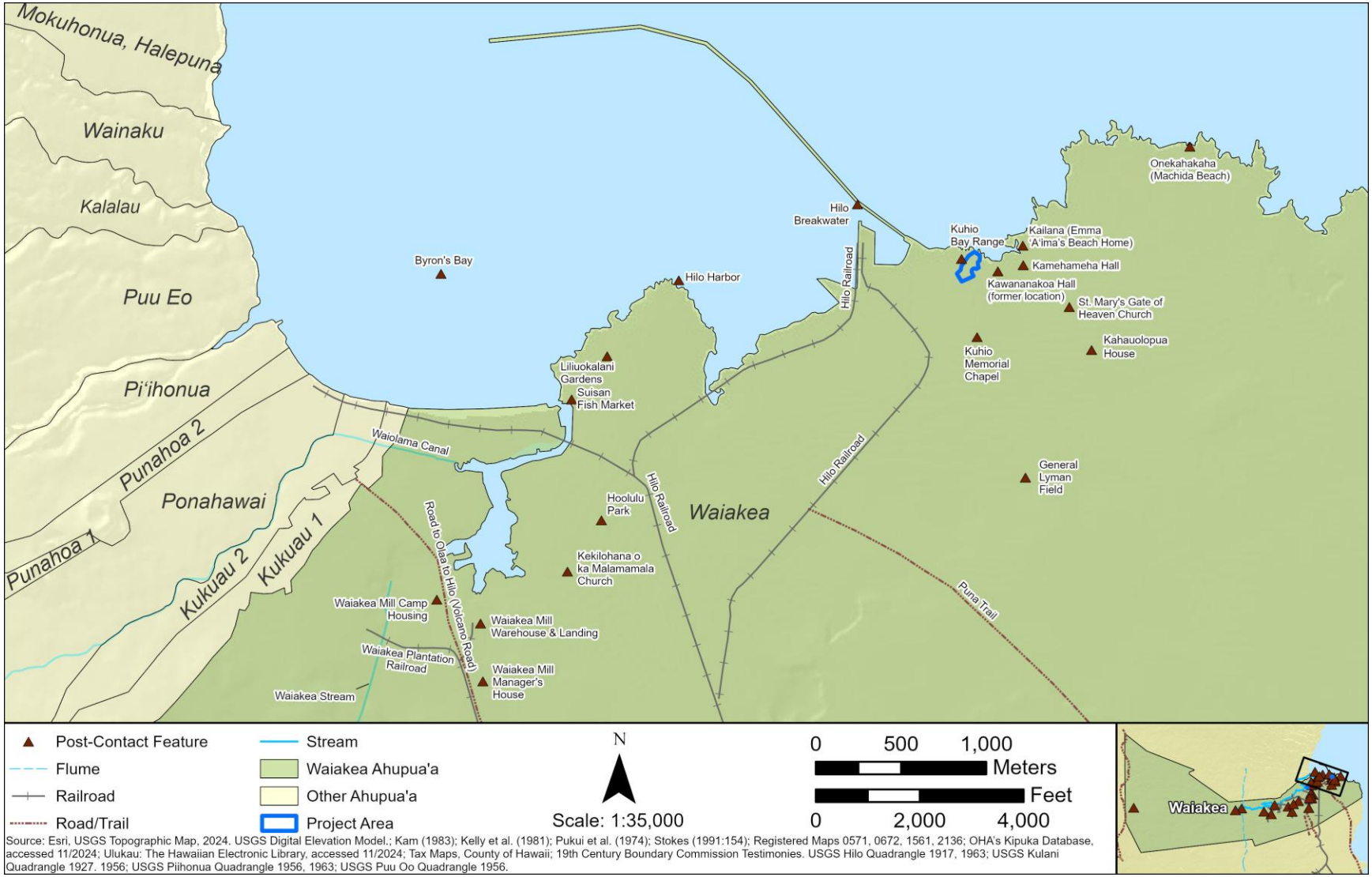


Figure 137. Significant post-Contact landmarks and features along the coast.

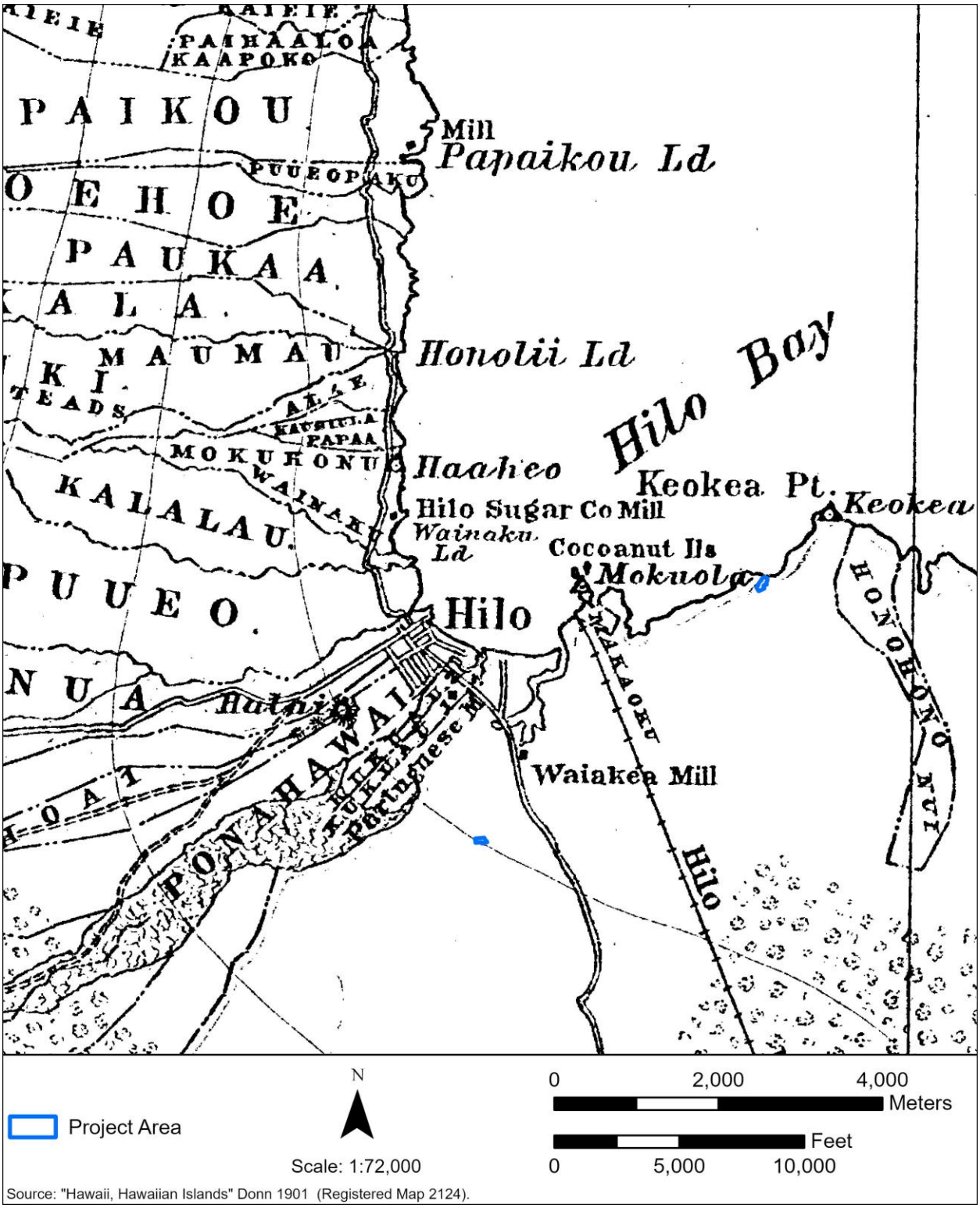


Figure 138. A 1901 map by Donn showing nearby developments, including Waiakea Mill, Hilo Sugar Co. Mill, and the Hilo Railroad which transported milled sugar to the harbor.

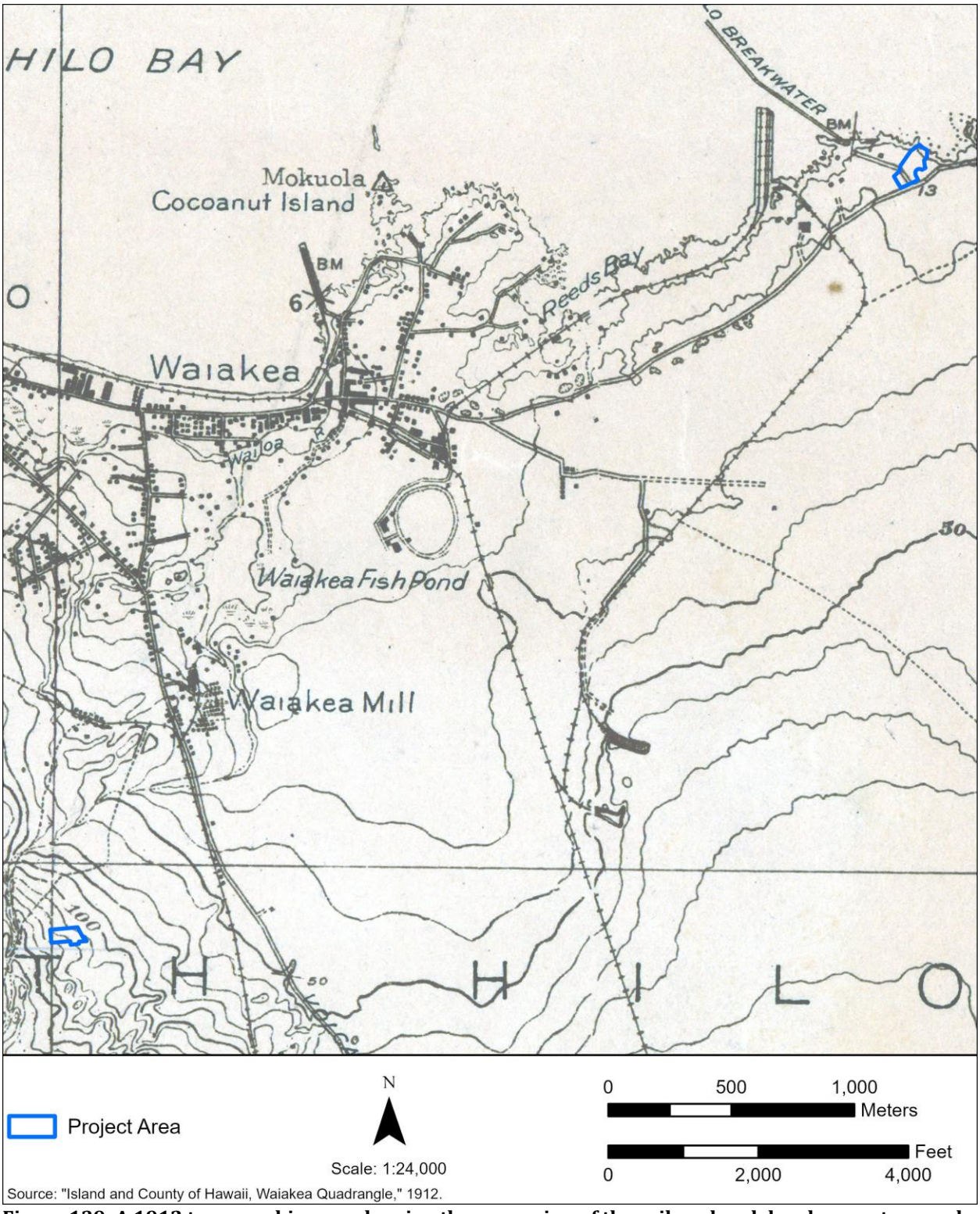


Figure 139. A 1912 topographic map showing the expansion of the railroad and development around the Waiakea Mill and harbor areas.



Figure 140. Aerial image from 1965 showing the Hilo Sewage Treatment Plant at Puhi Bay with the PACRC portion of the HIFL project area overlaid.

3.6.8 The Keaukaha Homestead Lands

20th-Century Keaukaha Before Hawaiian Home Lands

In 1989, Rhea Akoi published *Kuu Home I Keaukaha*, a compilation of archival records and oral histories related to Keaukaha. Many of the *kūpuna* (elders) interviewed by Akoi lived in Keaukaha prior to the establishment of the Hawaiian Homestead community in 1924. Their memories provide insights into life at Keaukaha prior to this significant transition in Keaukaha's history.

Mary Kua recalled living "way past Seaside," where there were only three other houses, for the Kapuni family, the Kahaawi family (her family), the Mokuole family, and the Malo family. Her family mostly lived on resources from the ocean, and she recalled picking *ʻopihi* and *wana* from the beach, pole fishing, and preserving fish by salting and drying. There was also ʻ*aʻama* (black crab) and *heʻe*. They planted sweet potatoes, taro, bananas, peanuts, and carnations, and she recalled others had planted carnations and sugarcane. They supplemented this with *poi* (cooked and mashed taro corms) purchased from Fong Hing in Hilo and bread for 5 cents per loaf. They would get to town either by canoe or walking on a trail. Although her parents' house was made from corrugated iron and boards, her grandparents' home was made from *pili* (*Heteropogon contortus*) grass. She recalled that the *hale* made from *pili* or *lauhala* never leaked during the rains. She also described how her grandparents would use *kukui* (candlenut; *Aleurites moluccana*) nuts for light:

> They shredded the nuts into a stone and then they lighted it without roasting it. It is much better if you roasted the nuts though, because there would be more oil. It was not smokey, and when those lamps burned, they burned real nicely. (Kua in Akoi 1989:11)

When her grandmother passed on, her cousin built a fire in her house for cooking, instead of outside as was normally done, and this fire burned the house along with all of her grandmother's things, including her calabashes, nets, and quilts. When she was around 14, Mary Kua and her family were one of the first to move onto the homestead lands (Akoi 1989).

George Kahoilua was raised at Onekahakaha, and remembered when this beach was filled up with sand all the way to the parking lot, and the fish there used to be so plentiful that his father could see all the fish in the sea while he was standing at their veranda. There are sharks in these waters, but Kahoilua was told by his grandfather that anyone born in the area did not have to worry about sharks. His grandmother and grandfather are buried at Onekahakaha, and next to their graves was a *heiau* (Akoi 1989).

Akui Aina was born in 1895 in Waiākea. His father, Shim Ung Aina, helped build the stone wall that ran across Lokoaka Pond, so that people could get from Leleiwi to Waiākea without a canoe. They did not need stores during this time, because they were able to get *wana*, *ʻopihi*, and plentiful fish from the ocean. Between this, gardens filled with vegetables, taro, and sweet potato, and raising chickens and pigs, they had all they needed. He remembered the tidal wave of 1946, and that there was no warning before it happened, and the wave destroyed everything.

Louise Kahoilua, who moved to Keaukaha with her family in 1919, recalled that they would plant sweet potatoes, bananas, taro, and a few vegetables for food. Because they did not have a water system at this time, they stored their cooking and drinking water in a 2,000-gallon tank. During

droughts, they would go to all the different ponds in Keaukaha for water. She recalled it was fun to meet with all the different families at Auwili when it was washing day.

Keaukaha-Panaewa Hawaiian Home Lands

In 1920, the Hawaiian Homes Commission Act was passed, which designated a portion of former Crown and Government Lands for Hawaiian Homesteads. Executive Order (EO) 421 also set aside a portion of the Government Lands in Keaukaha for the Keaukaha Beach Park. The PACRC portion of the HIFL project area falls within the lands designated by EO 421 (Figure 143). In December of 1924, the Keaukaha-Panaewa Hawaiian Home Lands were among the first Hawaiian Homesteads to be established, following the Hoolehua and Palaau Homesteads on Molokai earlier that year.

In May of 1924, around the same time that the Hawaiian Homesteads were being planned in Keaukaha, the Territorial Government was making plans to develop a series of lots for sale in the same area. The "Keaukaha House Lots" were determined at this time to not lie within the lands set aside for Hawaiian Homesteads, and were planned for sale by public auction. Figure 142 shows a portion of Keaukaha House Lots 1 through 4 lying within the PACRC portion of the HIFL project area. A total of 235 Hawai'i residents signed a petition in protest of this sale, which argued that there were already Hawaiian families living on some of these lots, and that they constituted a portion of the lands meant to be set aside for Hawaiian Home Lands. They also argued that a public auction would price out the local residents in favor of those with more financial means, noting that the appraised value of the lots placed them out of reach to all but foreigners and the very wealthy. Later that same month, the Territorial Government withdrew the sale of the Keaukaha House Lots and instead included these lands in the acreage set aside for the Hawaiian Home Lands (Kapuni-Reynolds 2024).

In 1925, $10,000 was appropriated for Keaukaha roads so that homesteaders could haul building materials to their lots. By 1926, the Executive Secretary of the Department of Hawaiian Home Lands, Rudolph Duncan, reported that 40 families had built on their lots. Akoi (1989) listed the names of families that were awarded homestead lots by group.

A 1927 article in the *Hilo Tribune-Herald* announced that 50 new homesteads would become available after January 1, 1928, and marveled at the productivity of the homestead lands:

> On one homestead, held by an Hawaiian named Kupe (Kiupe according to Akoi 1989), papaias [sic] sugar cane, sweet potatoes, avocado pears, taro and numerous flowering plants are growing as luxuriantly as though the soil were 20 feet deep, yet there is hardly a trace of earth on the pahoehoe…
>
> …In his work he has uncovered numerous mounds of earth surrounded by walls of stone in which he believes Ancient Hawaiians planted their taro and sweet potatoes. According to Kupe and several other residents there are evidences of a large settlement at Keaukaha in years gone by. (Hilo Tribune-Herald 1927)

This article also described bananas sprouting from cracks in the *pāhoehoe* and *kalo* and sweet potato growing in sufficient quantities for homesteaders to live on, in addition to the abundance to be fished from the sea (Hilo Tribune-Herald 1927).

The boundaries of the Keaukaha Panaewa Home Lands changed throughout the mid-to-late twentieth century, often in ways that were contested by the Hawaiian homesteaders living in Keaukaha. USGS maps of the area from 1917 and 1932 show a significant amount of residential and infrastructural development during the early 1900s. This included the development of new subdivisions, the establishment of homestead lots in Keaukaha, and the construction of the nearby Hilo Airport (Figure 141 and Figure 144).

In 1938, a new subdivision was built at Keaukaha and housed 50 new families by 1940. A 1938 map shows the Hawaiian Homestead plots, as well as land set aside by an EO for Navy and Military Reservations and a lighthouse. The PACRC portion of the HIFL project area lies within some of the land set aside for the U.S. Military by EO 176 (Figure 145). In 1942, fifty families were evacuated and their lots were taken over to expand the Hilo Airport during World War II. The airport was renamed General Lyman Field in 1943. Some of the families could be relocated to other areas of Keaukaha, but many more moved to Hilo. In 1958, an additional 92 acres of Keaukaha Home Lands were set aside by EO to create a runway. The appropriation of these 92 acres remained contentious, and in 1975 the director of DHHL, Billie Beamer, questioned the legality of the order. After a series of political battles and protests, it was ruled in 1980 that the Department of Transportation would be required to pay rent to DHHL for these 92 acres (Akoi 1989).

Kawananakoa Hall was completed in 1938, and the Keaukaha Nursery was established there, as well as a monthly clinic for maternal and infant hygiene. The original location of Kawananakoa Hall was just to the east of the PACRC portion of the project area. However, the hall was moved to Baker Avenue after the devastation of the 1946 tidal wave. Luella Aina recalled memories of Kawananakoa Hall, as well as the tidal wave that destroyed its original location:

> I can remember Kawananakoa Hall in the front street right where the sewer plant is. The nursery there with Mrs. Hohu and Mrs. Ioane. They taught us ball skills such as bounce, dribble, throw, pass, catch, running, hopping and skipping. I remember very clearly because I had a difficult time learning. Those were the two very dedicated people in our young lives, teaching us the beginning skills which were very important for an athlete.
>
> Then I remember April 1st. Mr. Henry Umuiwi driving up Pua Ave. yelling, "Tidal wave! And we thinking it was a joke. We found out later that that big joke took away Kawananakoa Hall and made us a blow hole. The "Blow Hole" became one of our swimming spots, along with BBP, Shet Island, and Auwili beach. (Luella Aina in Akoi 1989:85-86)

In the 1950s, Keaukaha Hawaiian Village was built to provide a "centralized entertainment area – a place where visitors could see Hawaiian crafts and entertainment in an authentic setting" (Akoi 1989:80). Community members pitched in to the construction, supplying *ʻōhiʻa* logs from Panaʻewa, *pili* grass from Waikii, *lauhala*, and ti leaves to make grass huts and stalls to sell Hawaiian crafts. The village thrived until tourism declined in the 1970s, and then was no longer in use (Akoi 1989). However, this area continues to be used as an important gathering and meeting place for the community (Kapuni-Reynolds pers. comm. 2025).

A 1959 survey for the Waiakea Development Project shows the PACRC portion of the HIFL project area continuing to reside in lands set aside for a Military Reservation and the Keaukaha Beach Park, as well as post-war industrial development of the harbor and wharf area to the west. This included lots for warehouses, the Hawaiian Broadcast System, bulk sugar storage tanks, and the Pacific Guano and Fertilizer Company (Figure 146).

The interviews published by Akoi (1989) also provide information on Keaukaha following the establishment of the homesteads. Portions of the interviews especially relevant to valued resources and cultural practices are summarized below.

Edith Kanakaole's family moved to Keaukaha in 1924 and was one of the first to live on homestead lands. She recalled the land being more bare, with hardly any trees, and they used buggy trails to travel to town. They had an open-air cook house, and collected their water in rain barrels. Much of her time was spent planting flowers, potatoes, taro, bananas, and other food plants. She explained that the area had a rich history that had not been recorded (Akoi 1989).

When Louise Kahoilua's family moved into the homestead lands, she recalled that everyone had to build their own houses. She joked that they would be called the "County tool boxes," because they were made of anything that might work, including piano boxes. If they didn't build, it would be taken as a sign that they were not really interested, so her family built a small shack that worked just well enough to hold off the rain so that they could hold the land. She remembered all kinds of plants growing in the soil much more successfully than they grow now. She preferred pounding *ʻulu poi* to taro because she found the taro to be *pupuʻu* (lumpy). Her family would add flour to the *poi* to make it stretch, but there was a specific way to do this to not make the *poi* turn out too sweet. Other common foods she remembered were shrimp, salmon, fish, and *kālua* (baked in underground oven) dog. It was her job to clean the flower patches, where carnations, sweet williams, and roses alongside *pīkake* (Arabian jasmine; *Jasminum sambac*), *ʻilima* (*Sida fallax*), and tuberose. Her mother would sell *lei* (flower garlands) made from the flowers that grew in their garden, and later she did the same. The *lehua lei* were the most valuable and cost $1, which was at least twice as much as the other *lei*. She remembered swimming at Onekahakaha. When the 1946 tidal wave hit, she recalled seeing water oozing out from the ground, and water from the ocean coming down the road, and smelling mud before the wave hit. At new year's, they would have *kālua* pig and a big *lūʻau* (Akoi 1989).

Elizabeth G. Luahiwa Lee Loy recorded memories of her mother's eldest sister, Louisa Waipulani Heeia Beck (Akoi 1989). Aunty Louisa was awarded Lot 2, on Kalanianaole Ave., in 1927, and lived there until 1933. Lee Loy remembered when she visited Keaukaha, everyone was speaking Hawaiian and there was always raw fish and *poi* in the house, sometimes other delicacies like dried, raw, or boiled *heʻe*.

In Eva Kauka Malo's recollections of childhood as told by Bob Krauss, her husband and sons would hunt for sea cucumbers at Leleiwi and sell them. They had a famous *kūlolo* (taro and coconut pudding) recipe, and taught the church youth how to grate the taro and coconut and cook sugar to the molasses stage (Akoi 1989).

Lucy Loa described how every day her mother would catch fish with her bare hands by feeling under the rocks for fish, then building the rocks in a circle to create a trap: when the tide went up, the fish would go in, and then would not be able to get back out again once the tide went back down. She observed that "before, Keaukaha was full of trees and bushes, which made it look like a forest in the back. There were trails which were used to go places because there were no roads" (Loa in Akoi 1989:46).

Kaimoon Calles recalled that when they moved to Keaukaha, they would carry lumber on trails to build their house, and later Desha Road was made out of coral. His father worked for Hawaiian

Contractors who built the Hilo Breakwater, and he described how the rocks would arrive via railway:

> The stones or boulders came from Kapoho. It came on flat beds by way of railroad, all the way from the quarry in Kapoho. This railway also carried passengers and the end of the tracks was in Paauilo. When the train reached the wharf, the stones were put on a barge, out where the derrick was. It would place the rocks to form the breakwater. The inspector use to be Kauka and then Napeahi. (Calles in Akoi 1989:47)

Calles described tying a string around his waist when he went fishing, and using a piece of wire as a needle to thread speared fish onto the string. Once the string was full, they would go to shore to empty their haul, and then swim back out and do it again. He was not scared of sharks, and learned from his mother that there was one shark which took care of its own area, and would swim the bay from end to end. They had plenty to eat, including ʻ*ulu*, *poi*, rice, sweet potato, fish, *ʻopihi*, and *pipipi* (nerites; Neritidae). He noted that when people passed away, they were buried in yards or in caves around the present-day location of the airport (Akoi 1989).

Abbie Napeahi moved to Keaukaha with her family in 1927. She described her family as a swimming family, and remembered gathering *ʻopihi* and *limu*, and diving for *wana*. She recalled Scout Island as being filled with fish and *wana*, and she would watch Uncle Akui and his blind mother dive into the water, cast a net around the rocks, and pick up enough fish in the net for their family to eat (Akoi 1989).

Luka Kanakaole described planting sweet soursop, mango, *kukui*, and *laʻamia* (*Cresentia cujete*), a plant that was rare by the late 1900s but which had a round seed that could be used as *ʻiliʻili* (pebbles, also used within dance instruments). He remembered it was his job to mix the lumps out of the *poi* his family would purchase from the *poi* factory. As a boy, he worked in the taro patches where the Lyman House is now, and made butter for the dairy.

Henry and Agnes Auwai described making a starch for clothing from *pia* (arrowroot; *Tacca leontopetaloides*):

> To make the starch, you have to scrape, scrape, the starch then you dry it on a white sheet of paper cloth. You strain it looks like slate chalk. When they want to use it, they mix it with hot water then put your clothes in. If you make it heavy, then the starch will be stiff. You can make it light putting more water. And that is grow starch, free starch. That's what they call Pia Hawaiian starch. (Auwai in Akoi 1989:57).

Their family grew corn to sell, as well as some pumpkins and sweet potatoes. They would follow the moon cycles for planting, and grew abundant crops in Keaukaha, including some of the largest watermelons their neighbors had seen grow there. The sweet potato was dried, then cooked, then dried again so that it could be turned into flour. The pigs, chickens, and cattle were not sold but were slaughtered and given out to the families who would help when it was time to harvest the corn. The Auwais recall people from the beach still trading fish and *ʻopihi* for meat with people from the mountain (Akoi 1989).

Ethel Pua Borges remembered looking forward to swimming from the breakwater to Onekahakaha Beach, and looking for *ʻopihi*, *pipipi*, and *limu ʻeleʻele* to make lunch for the day. Eleanor Ahuna remembered camping on the beaches for months at a time, where her father would build a tent near the breakwater or in front of the sewer system.

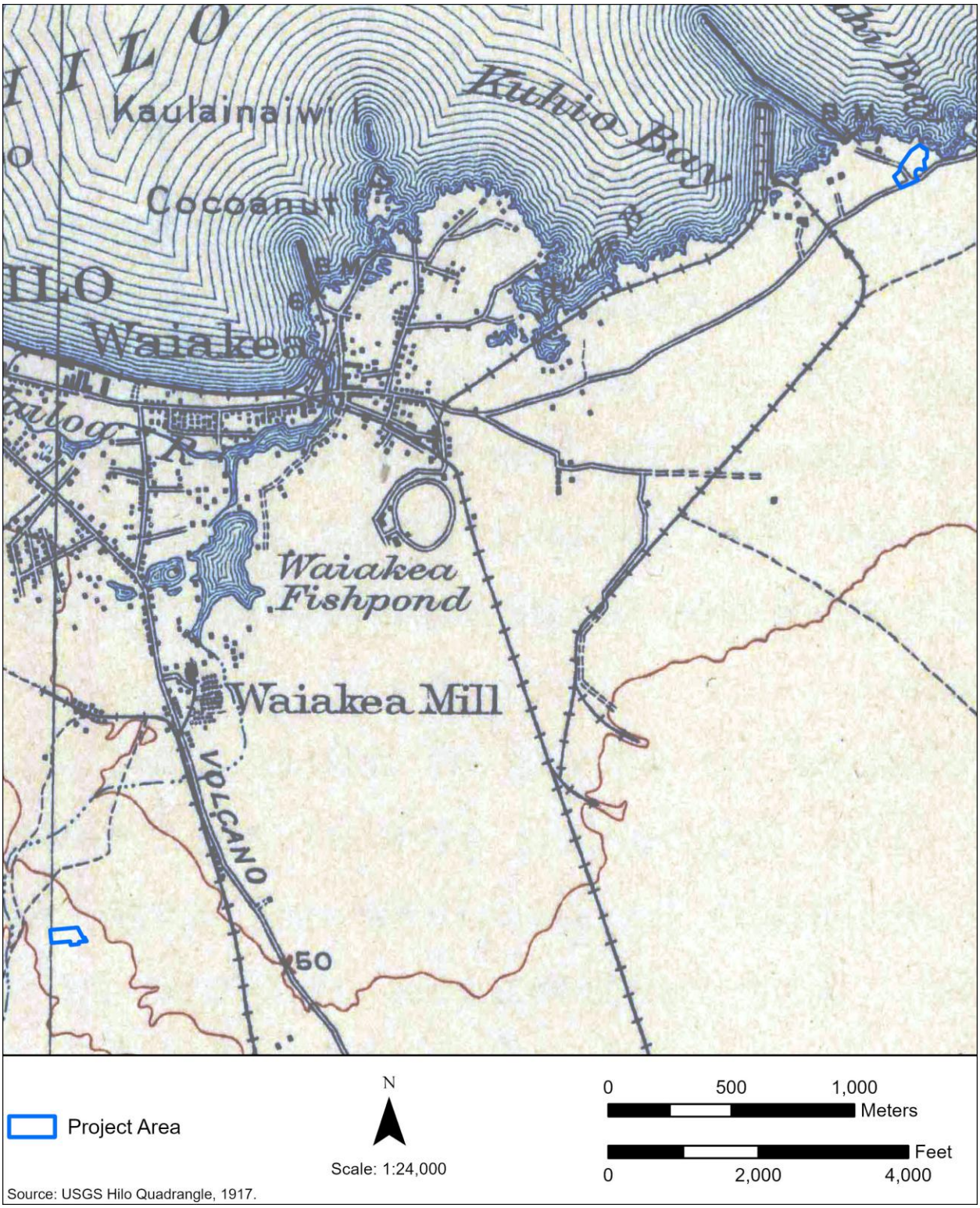


Figure 141. A 1917 USGS map shows the prominence of the Waiakea Mill during this time, a developing Hilo Town, and limited settlement in the Keaukaha area.

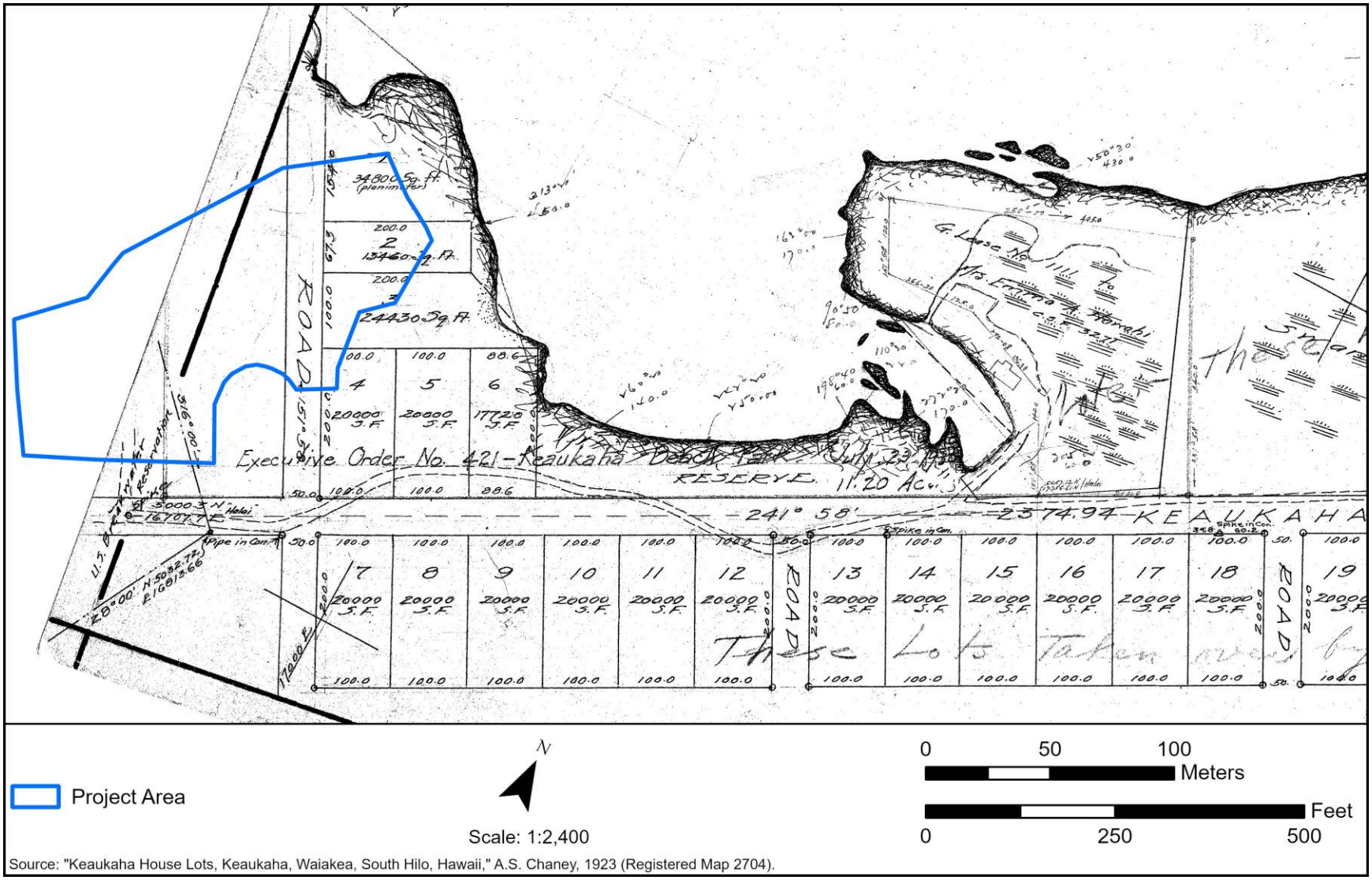
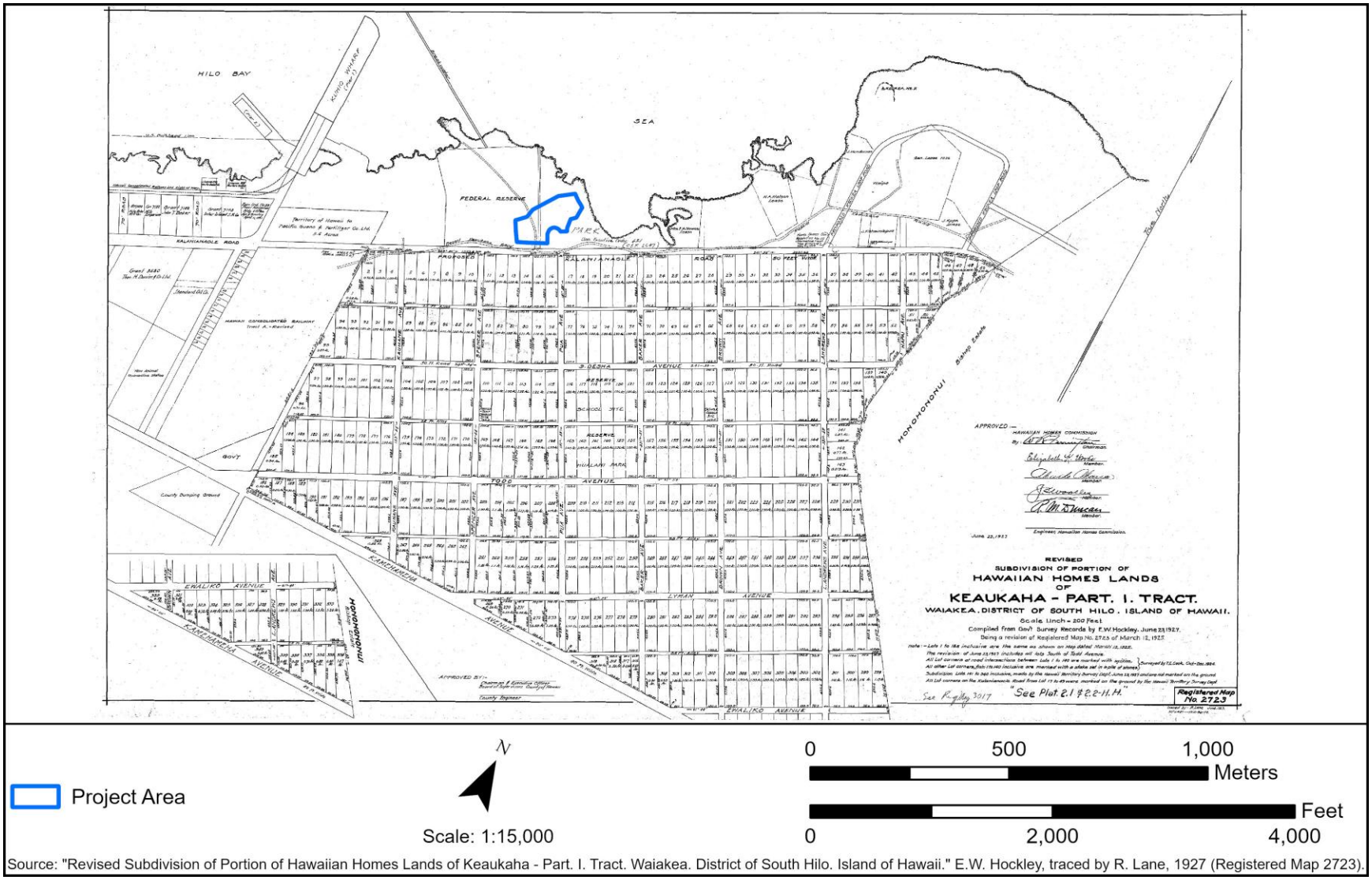


Figure 142. A 1923 survey map of the Keaukaha House Lots, showing portions of lots 1 through 4 within the PACRC portion of the HIFL project area.



Source: "Revised Subdivision of Portion of Hawaiian Homes Lands of Keaukaha - Part. I. Tract. Waiakea. District of South Hilo. Island of Hawaii." E.W. Hockley, traced by R. Lane, 1927 (Registered Map 2723).

Figure 143. A 1927 map showing the subdivision of a portion of Hawaiian Home Lands in Keaukaha, and the PACRC portion of the HIFL project area within the lands set aside for Keaukaha Beach Park by Executive Order 421.

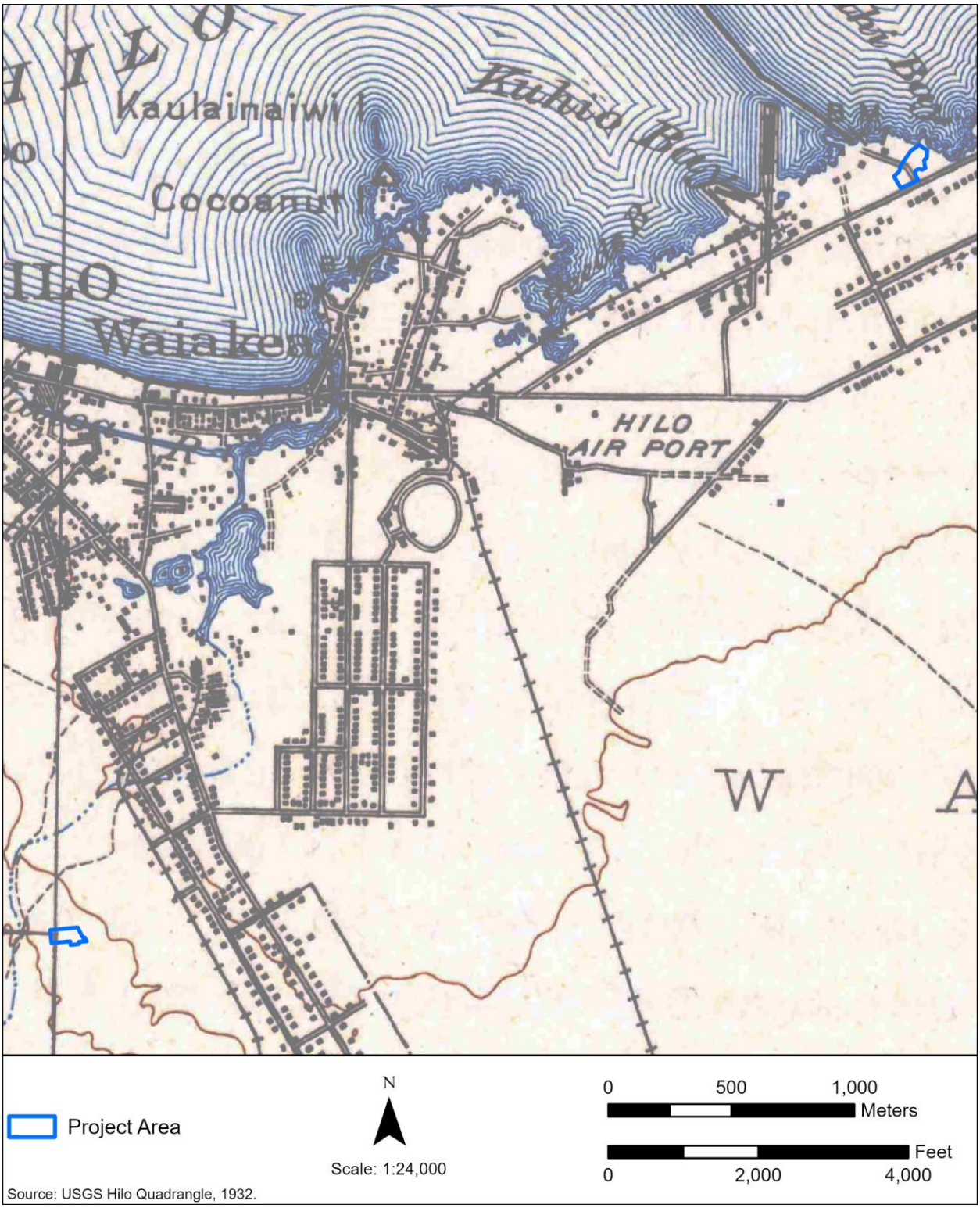
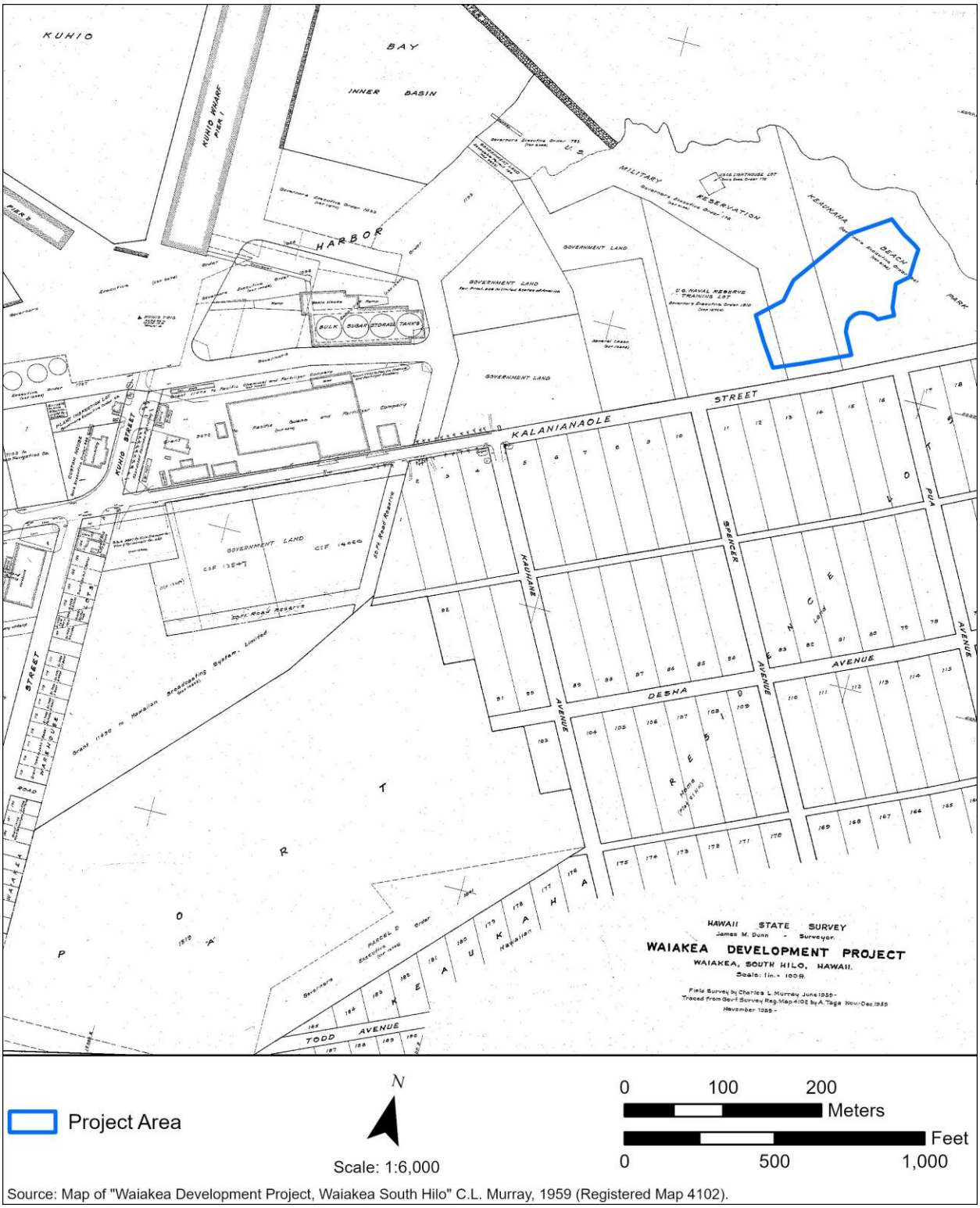


Figure 144. A 1932 USGS map shows increasingly dense settlement around Hilo, including the development of new subdivisions, Hawaiian Homesteads, and the Hilo Airport.



Source: Map of "Hawaiian Homes Land of Keaukaha Tract 1, Waiakea South Hilo" C.L. Murray, 1938 (Registered Map 3017).

Figure 145. A 1938 map of the Hawaiian Home Lands in Keaukaha with the PACRC portion of the HIFL project area in lands set aside for a U.S. Military Reservation by Executive Order 176.



Source: Map of "Waiakea Development Project, Waiakea South Hilo" C.L. Murray, 1959 (Registered Map 4102).

Figure 146. A 1959 state survey map for the Waiakea Development Project showing Hawaiian Homes lots and post-war industrial development around the harbor with the PACRC portion of the HIFL project area.

3.6.9 From Cane Lots to Campus

The Waiakea Mill Company was founded in 1879 and remained in operation until 1946 (Figure 147). It became one of the main milling operations in Hilo, with over 6,000 acres of land under sugarcane cultivation by the early 1900s. Maly (1996) completed detailed archival and oral historical research on the history of the Waiakea Cane Lots, within which the portion of the project area at UH Hilo lies (Figure 148 and Figure 149).

In 1913, the Legislature of the Territory of Hawaii enacted Act 167, which appropriated $15,000 to the commissioner of public lands to open homesteads in Piʻihonua and Waiākea, and grant leases to homesteaders who would grow sugarcane to send to Waiakea Mill to process. As the Waiakea Mill Company's 30-year lease of Waiākea's lands drew to a close in 1918, an agreement was reached between Waiakea Mill Company and the Territory of Hawaiʻi, and roughly 5,300 acres of Cane Lots and House Lots were leased to individual homesteaders in 1919. It did not take long for this arrangement to sour. In 1920, a Waiakea Homestead Commission (WHC) was established to address complaints from the homesteaders regarding Waiakea Mill Company's failure to fulfill its side of the agreement. The concerns included:

> …the cutting of cane, applying of fertilizer to the crop of 1920—the cost of which was absorbed by the Mill Company—discourtesy of the manger, failure of the Company to supply men and mules when needed, black list, etc… (WHC Chair, William Goodale to Governor Farrington, December 18, 1929, as quoted in (Maly 1996:28)

The Waiakea Mill Company in turn blamed the homesteaders for losses sustained from 1920 to 1923. A settlement was reached in 1922, and the homesteaders who were able to pay their debts and maintain the requirements of residency were given clear title to their homestead lands. Many continued working in sugarcane cultivation and milling until around 1946, though others shifted from sugarcane cultivation to planting flowers and vegetables and raising chickens and pigs. These land use changes, combined with the expansion and development of Hilo Town, further reduced the land available for sugarcane agriculture (Maly 1996, Smith 1941).

A 1941 article on the history of the Waiakea Mill Company described the environmental setting of the plantation lands, and the Company's efforts to drain the swamplands and plant them in sugarcane:

> Waiakea plantation has two distinct types of soil, brown and clayey on the broad flats at the lower end and above, a black volcanic forest soil overlying a-a and gravel, very rocky. The lay is east or a little south of east. Slopes are gradual, without high hills or deep gulches. A wide "valley" which may have been an ancient stream bed at the lower end of the upper section, towards Hilo Sugar company's boundary, is the company's "best" field, along with narrow strips of mellow, brown soils, free of rock, probably kipukas left between old lava flows.
>
> Normally there is too much rain, although little has fallen in the last 24 months. Monthly averages at the mill are around 14 inches; a mile above, 20 inches; two miles above, 25 to 30 inches. Below the 600-ft level rain and high temperatures make the cane grow, fields sometimes yielding 80 tons of cane and ten tons sugar per acre. Above the 1,000-ft. level, rain retards growth. Yields may be no more than 25 tons cane and barely two tons sugar per acre. The vagaries of the weather add gambling zest to cane agriculture for profit.
>
> Back in 1922 when the 16-year agreement was signed, the government gave the company a long lease at a nominal rental on the square mile of sedgy swamp south of the cane lands, the

> consideration being that the swamp should be drained and planted. A long, narrow waterproof sheet of solid pahoehoe blocked the drainage from the forest. A series of holes 15 feet apart were punched through the pahoehoe at the edge of the forest, cutting off the surface flow. About 250 acres at the upper end of the swamp held a layer of peaty leaf mould and by 1926 this was planted in cane. The whole makai end of the swamp was solid pahoehoe. (Smith 1941:15)

At the time of Smith's article, roughly 5,600 acres were under sugarcane cultivation for the Waiakea Mill Company, around half of which was harvested annually (Smith 1941). On June 19, 1948, all rights, title, and interest in land owned by the Waiakea Mill Company were sold to Senator William H. Hill. In 1949, Fairview Dairy obtained a 21-year lease on the lots numbered 11 through 20-A at public auction, and built fencing and rock wall enclosures to use for pasturage (Figure 150). In 1959, the dairy lease was transferred to William Kamaʻu Sr., who similarly used the land for cattle grazing and horse pasturage.

The first formal, university-level instruction in Hilo began in 1945, under the umbrella of what would become known as the UH Extension Division. In 1947, the Extension Division established a "Hilo Center," and rented a portion of Lyman Hall in the Hilo Boys School to house a director, two full-time and four part-time instructors. In 1949, this program was formally established as the University Center of Hilo within the Extension Division. In 1951, Oren E. Long decided to eliminate the Hilo Center, which was met with immediate protest by both the community and legislative members from Hilo. To save the center, the University elevated the program from within the Extension Division to the University of Hawaiʻi-Hilo Branch, administered by the Dean of Faculties. From 1952 forward, the UH-Hilo Branch set out to grow a university with undergraduate instruction on par with UH Mānoa. At this time, still housed within a portion of Lyman Hall, it quickly became clear that the university would need to find a larger, more permanent home within Hilo. In 1953, funds were appropriated to establish the campus at Lanikaula Street, on an initial 37-acre parcel of former Waiakea Mill Company cane fields (Figure 151, Figure 152). In the fall of 1955, the UH-Hilo Branch began its first semester of instruction at its permanent location. In 1959, UH Hilo was accredited by the Western Association of Schools and Colleges (Inouye and Kormondy 2001)

After settling in to its permanent location, the UH Hilo campus continued to grow. In 1970, Dr. Paul Miwa was appointed as the first Chancellor of UH Hilo, and began developing a long-range plan for the campus that would distinguish it from UH Mānoa. His vision included the following:

> … a University Park of some 600 acres that would include all elements of UH-Hilo, including the Beaumont Agricultural Research Center, the Cooperative Extension Service, the Institute for Astronomy, the Cloud Physics Observatory, a multicultural study center, a College of Continuing Education and Community Services, and an Institute of Tropical Studies (Inouye and Kormondy 2001:13).

In 1973, the UH Regents approved a $43-million master plan that would triple the size of existing facilities and add new classrooms, offices, a library, physical education and athletic facilities, and parking structures. Aerial maps of the UH Hilo campus from 1954, 1965, and 1977 show the area's development from a nearly empty former cane field at its inception to an increasingly developed campus (Figure 153 through Figure 155).

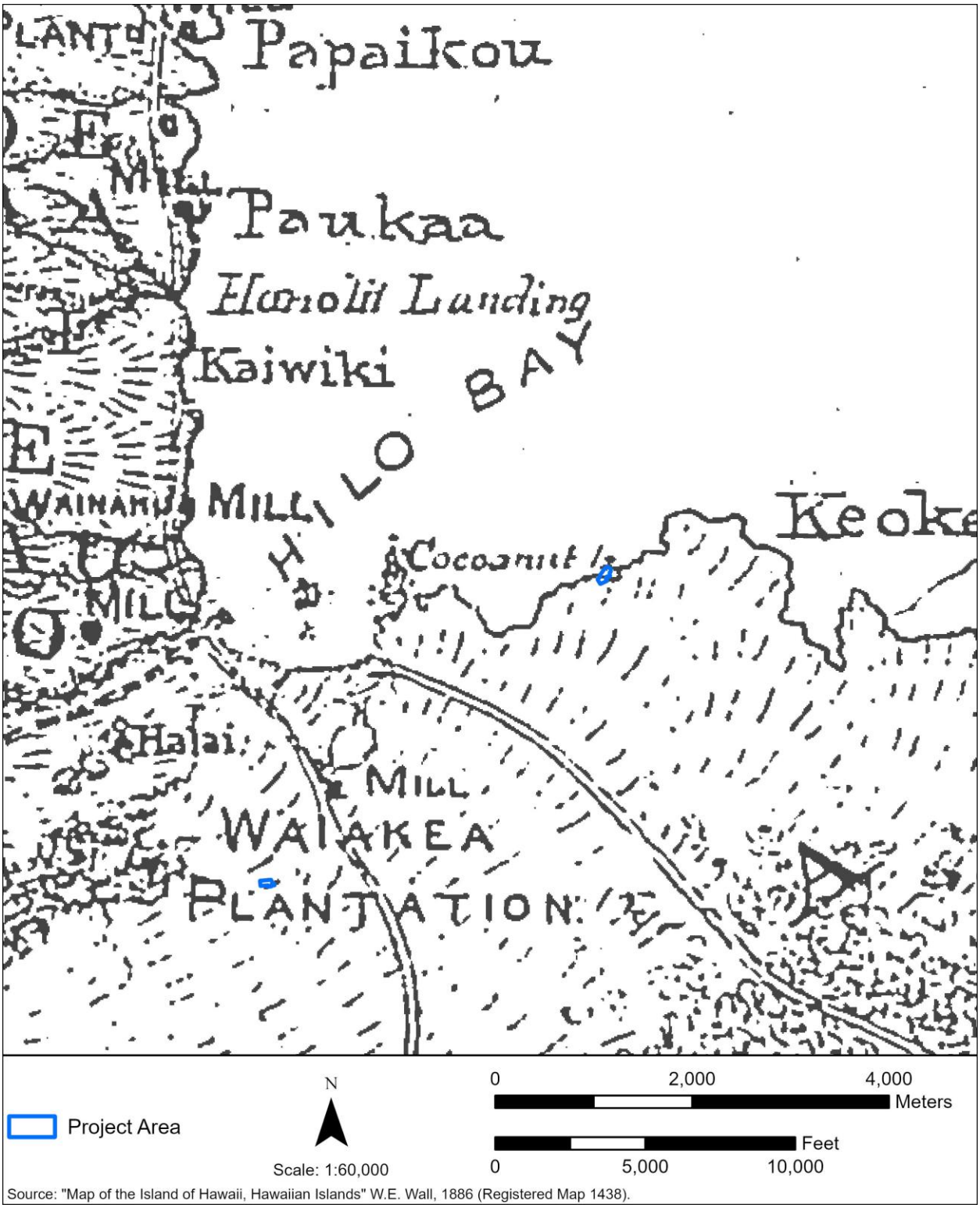


Figure 147. An 1886 map by Wall showing the Waiakea Plantation lands during the early years of its operation, with competing mills scattered along the coast to the north.

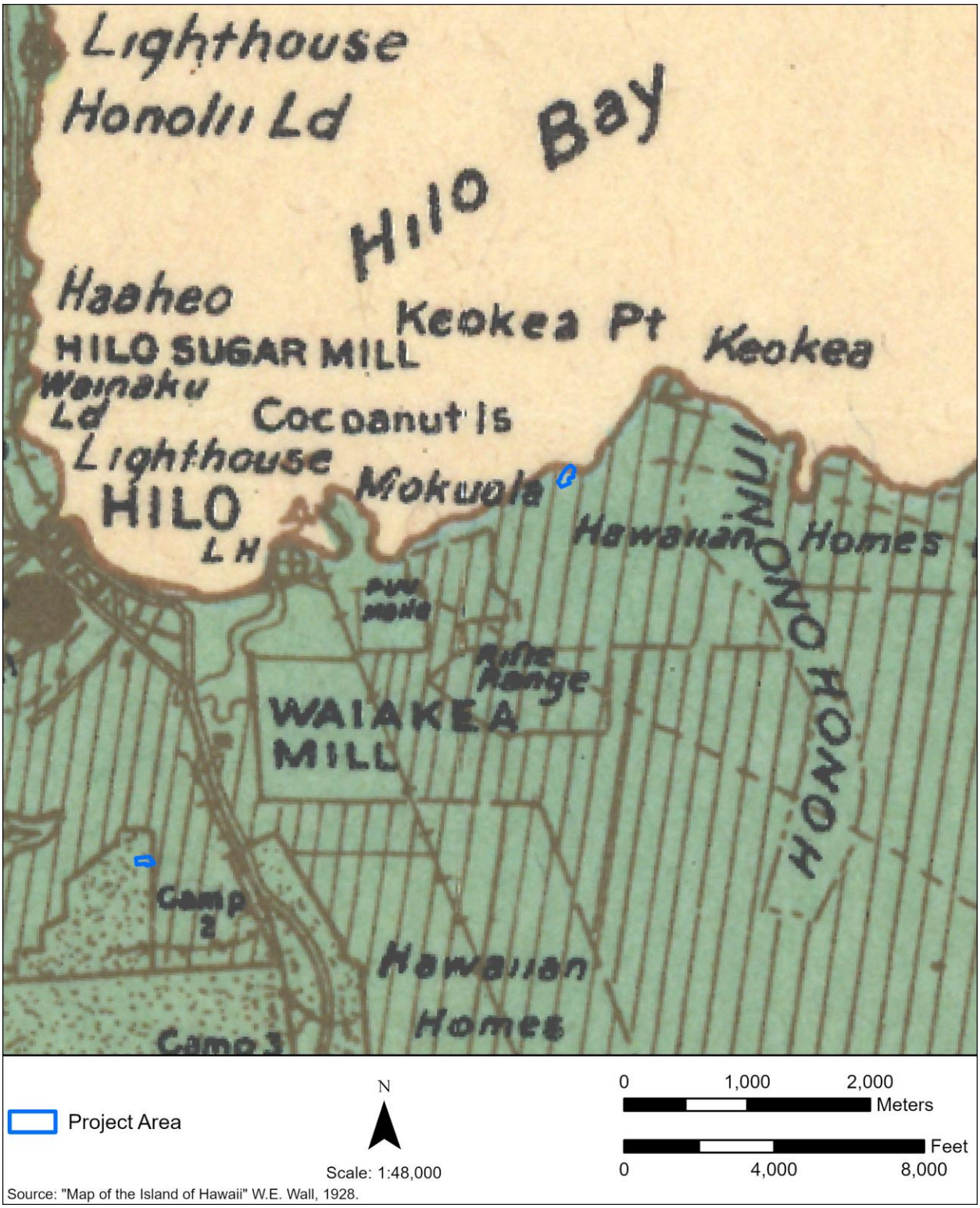
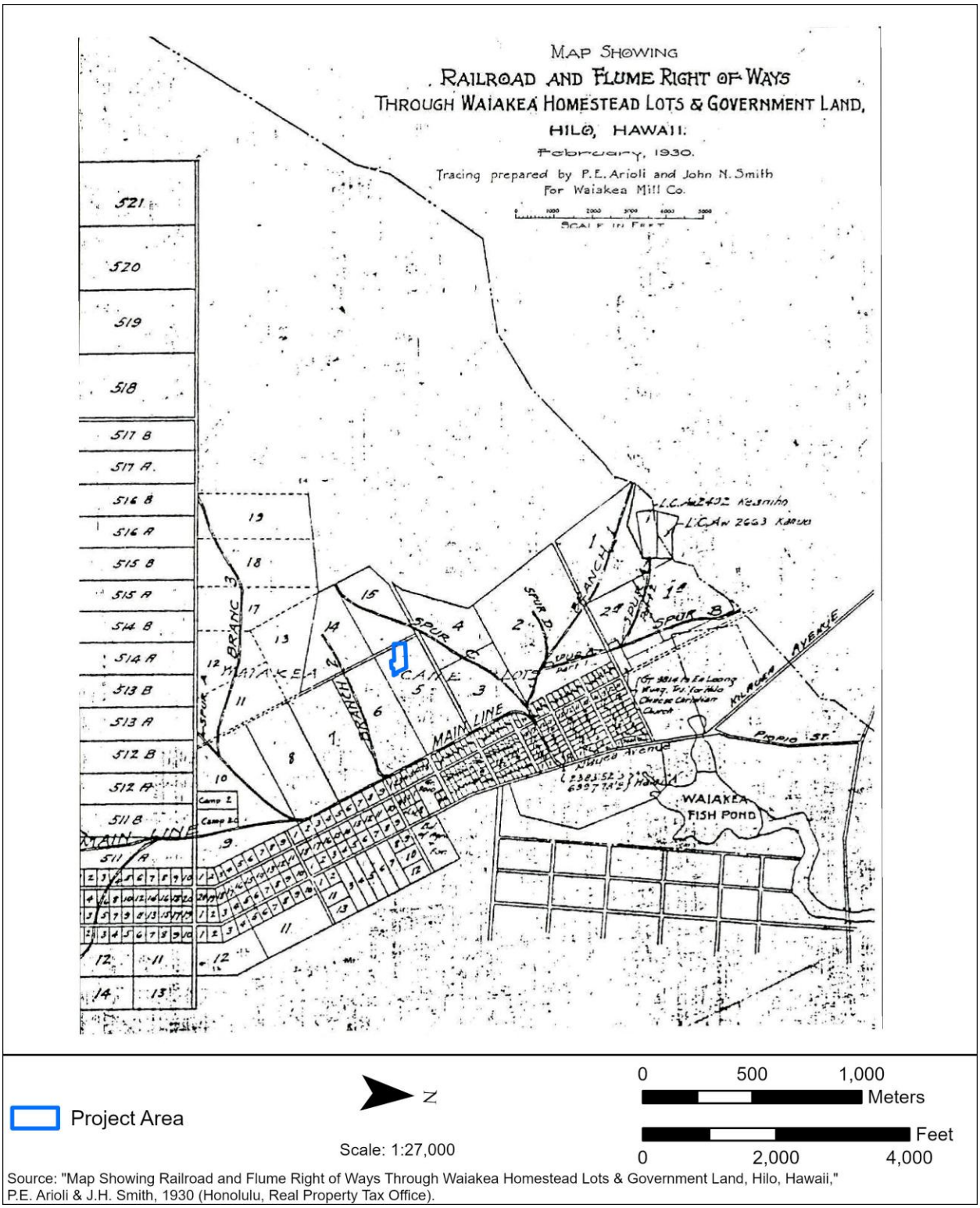
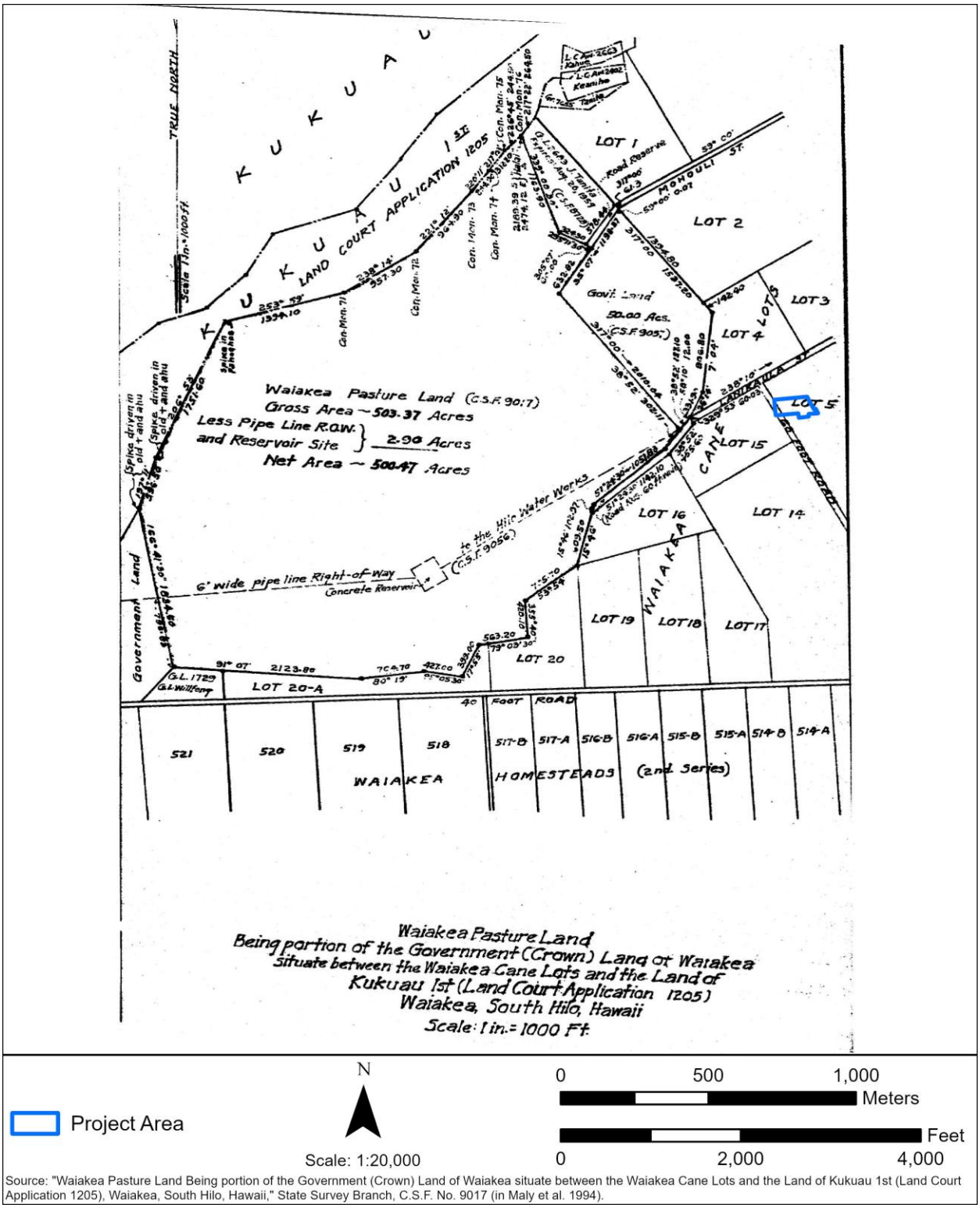


Figure 148. A 1928 map by Wall, showing the UH Hilo portion of the HIFL project area under sugarcane cultivation and the nearby Waiakea Mill "Camp 2."



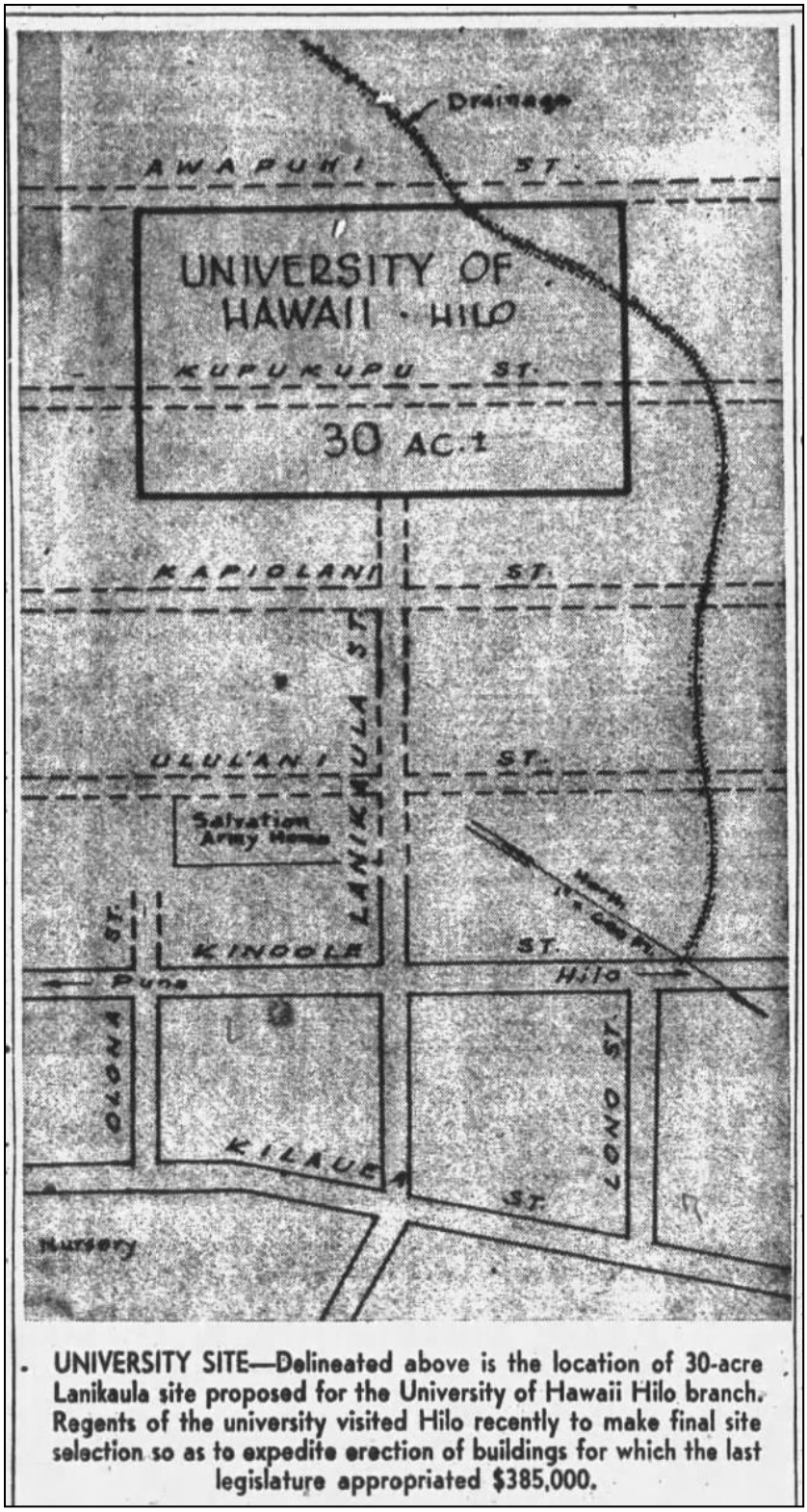
Source: "Map Showing Railroad and Flume Right of Ways Through Waiakea Homestead Lots & Government Land, Hilo, Hawaii," P.E. Arioli & J.H. Smith, 1930 (Honolulu, Real Property Tax Office).

Figure 149. A 1930 map of railroad and flume rights of ways, showing the UH Hilo portion of the HIFL project area in a portion of Waiakea Cane Lots 5 and 15, and within Lanikaula St.



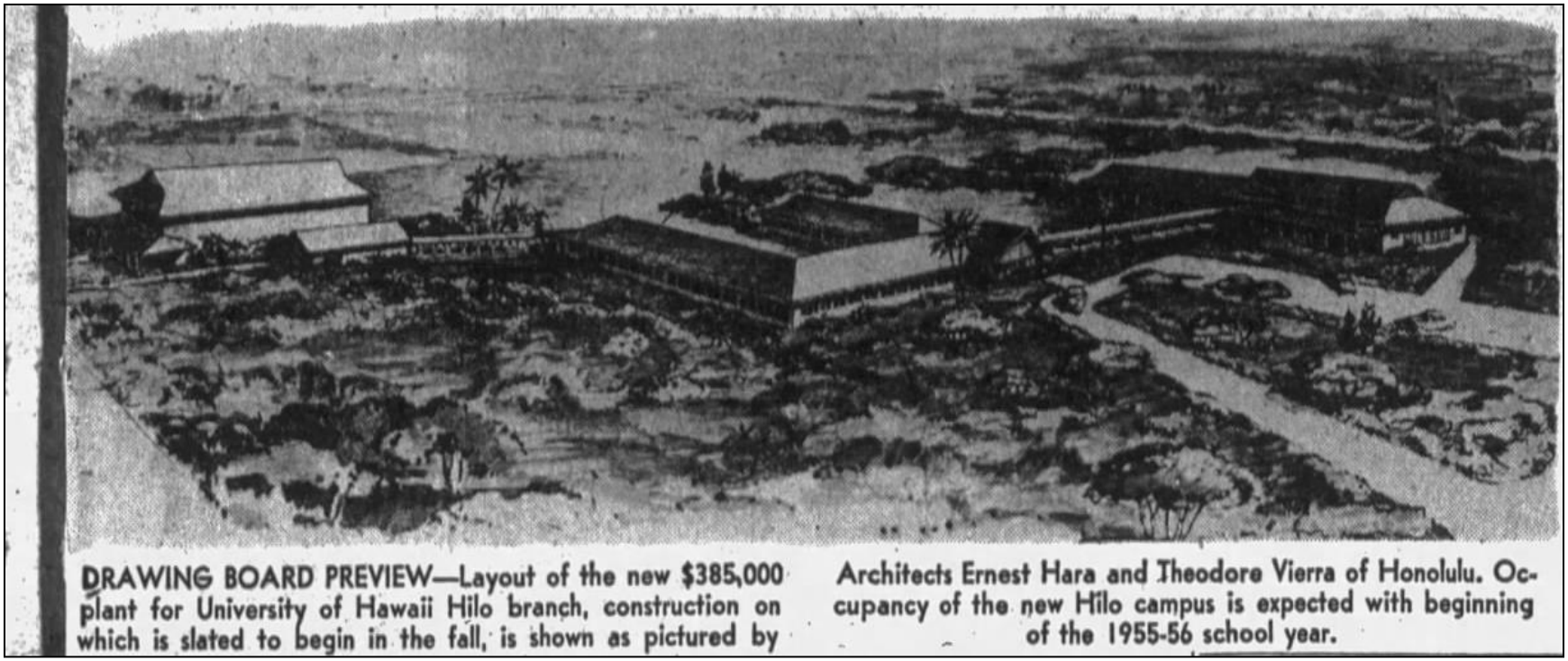
Source: "Waiakea Pasture Land Being portion of the Government (Crown) Land of Waiakea situate between the Waiakea Cane Lots and the Land of Kukuau 1st (Land Court Application 1205), Waiakea, South Hilo, Hawaii," State Survey Branch, C.S.F. No. 9017 (in Maly et al. 1994).

Figure 150. Map of Waiakea Pasture Land, showing the Waiakea Cane Lots to the west of the UH Hilo portion of the HIFL project area converted to pasture land (source: Maly et al. 1994).



UNIVERSITY SITE—Delineated above is the location of 30-acre Lanikaula site proposed for the University of Hawaii Hilo branch. Regents of the university visited Hilo recently to make final site selection so as to expedite erection of buildings for which the last legislature appropriated $385,000.

Figure 151. Map of the proposed permanent home for the UH-Hilo branch. The final location remained at Lanikaula Street, though the parcel expanded to 37 acres (*Hawaii Tribune Herald*, December 18, 1953).



DRAWING BOARD PREVIEW—Layout of the new $385,000 plant for University of Hawaii Hilo branch, construction on which is slated to begin in the fall, is shown as pictured by Architects Ernest Hara and Theodore Vierra of Honolulu. Occupancy of the new Hilo campus is expected with beginning of the 1955-56 school year.

Figure 152. A drawing board preview of the UH-Hilo branch (*Hawaii Tribune Herald*, May 23, 1954).



Figure 153. A 1954 aerial image of the former cane fields that would become the permanent home of the UH Hilo campus the following year.



Figure 154. A 1965 aerial image of the UH Hilo campus with the UH Hilo portion of the HIFL project area.



Figure 155. A 1977 aerial image of Hilo showing the further developed UH Hilo campus.

3.6.10 Previous Consultation for Nearby Projects in Waiākea Ahupuaʻa

The knowledge shared in previous CIAs for Waiākea Ahupuaʻa can provide further understanding of the cultural practices and the exercising of Native Hawaiian rights in this area. Despite the area featuring prominently in *moʻolelo* and *kaʻao*, community consultation data on traditional and current land use is relatively slim. Fielder (2005) and Wilson Okamoto & Associates, Inc. (2002) conducted CIAs in Waiākea Ahupuaʻa for projects near the project area. In the Keaukaha region of Waiākea, fishing occurred traditionally and today using a variety of methods from shore and at sea, such as pole, spear, and net fishing (Wilson Okamoto & Associates, Inc. 2002). Fishponds along the shore include Hale o Lono, Wailoa, Keonepahu, Kaumealani, and Kamokuna. People traditionally and still gather salt at Leleiwi, harvest *limu*, collect *ʻopihi*, *hāʻukeʻuke* (*Colobocentrotus atratus*), *wana* (sea urchin), and *pāpaʻi* (crabs), and gather medicinal plants (Wilson Okamoto & Associates, Inc. 2002).

People gathered plants such as *lauhala* and *hau* for cultural practices and use (Wilson Okamoto & Associates, Inc. 2002). Freshwater springs and flora that is usually associated with habitation were also described in the area, such as *ʻulu, kukui, ʻawa*, and *kī* (Fielder 2005). Cultivated crops included *ʻuala* and *kalo*.

Burials are known to be in the area and participants indicated the potential for unknown burials to be encountered (Wilson Okamoto & Associates, Inc. 2002). *Heiau* and other cultural sites are known in the coastal area. The area around Keaukaha was, and still is, known for its groves of *ʻōhiʻa lehua* and *maile*. People who live in the area utilized these forests for their wealth of resources. Trails extended into the forests and people traversed these well-worn paths. However, the construction of the airport limited their ability to continue utilizing the resources within their own *ahupuaʻa*, requiring them venture further afield.

Communities continue to rely on marine, coastal, and terrestrial resources for subsistence and recreation (Wilson Okamoto & Associates, Inc. 2002). Participants were concerned with the impact of development on gathering practices. They were also concerned with the disconnect that ensues when developments destroy cultural resources or cut people off from places. In addition to physical changes (i.e., fences, bulldozing of cultural sites), participants included noise pollution, such as aircraft, in this discussion. Participants advocated for ensuring traditional access to resources is maintained and enabled.

3.6.11 Previous Archaeology

A total of 15 archaeological studies have been conducted within a 0.5-mile (0.8-km) buffer around the Hawaiʻi Island portions of the HIFL project area. Archaeological investigations specific to the PACRC portion of the project area are presented in Table 22Table 22 and Figure 156. Archaeological studies within 0.5 miles of the UH Hilo portion of the project area are presented in Table 23 and Figure 157. A total of 41 historic properties has been identified within this 0.5-mile buffer. All previously identified historic properties are shown in Figure 158 and Figure 159 and described in Table 24 and Table 25, which also contain significance assessments and mitigation recommendations.

Eight historic properties were identified in the vicinity of the PACRC portion of the HIFL project area. All eight of these properties are architectural features associated with post-Contact

development of Hilo and Keaukaha. They include the Hilo Breakwater, Hilo Harbor, Hilo Railroad Company tracks, Peter Arioli House, Kahauolupua House, St. Mary's Gate of Heaven Church, Kuhio Memorial Chapel, and Kamehameha Hall.

During the field inspection that was carried out as part of the LRFI for the HIFL Project, three potential historic properties were identified in the PACRC portion of the HIFL project area. These included circular and rectangular concrete tanks that were likely constructed in 1965-1966 as part of the infrastructure for the Hilo Sewage Treatment Plant, and metal rebar and concrete pipe infrastructure that may have been related to the former sewage facility.

A total of 33 historic properties has been identified within 0.5 miles of the UH Hilo portion of the HIFL project area. Identified historic properties were largely features associated with post-Contact agricultural activities, and included platforms, mounds, modified outcrops, linear walls, pit features, enclosures, and drainage features. The majority of these features are associated with sugarcane cultivation by the Waiakea Mill Company, as well as the Hilo Dairy Facilities.

During the field inspection that was carried out as part of the LRFI for the HIFL Project, three potential historic property features were identified in the UH Hilo portion of the HIFL project area. These included a concrete culvert, as well as the Wentworth and Business Education and Technology Building, which were likely part of the original construction of the campus in 1955.

Table 22. Previous Archaeological Studies Within 0.5 Miles of the PACRC Portion of the HIFL Project Area

Reference	Type of Study	Findings
Rosendahl 1988	Archaeological Reconnaissance	No historic properties identified.
Haun and Henry 2000	Archaeological Inventory Survey	Identified one historic property with four features. None are located within 0.5 miles of the project area.
Rechtman 2009	Archaeological Inventory Survey	No historic properties were identified, and an archaeological assessment report was submitted to SHPD.
Barna and Kepa'a 2023	Archaeological Monitoring	Identified one new historic property (T-1; no SIHP number assigned) and one previously identified historic property: SIHP 50-10-35-07413, the Hilo Railroad track (Wolforth 2004, Wolforth 2006) during archaeological monitoring. Only SIHP -07413, the Hilo Railroad track, is located within 0.5 miles of the current project area. The site was previously assessed as significant under Criterion d and recommended for no further work. However, Barna and Kepa'a (2023) recommended that future projects document the remaining portions of the tracks not included in their project area.

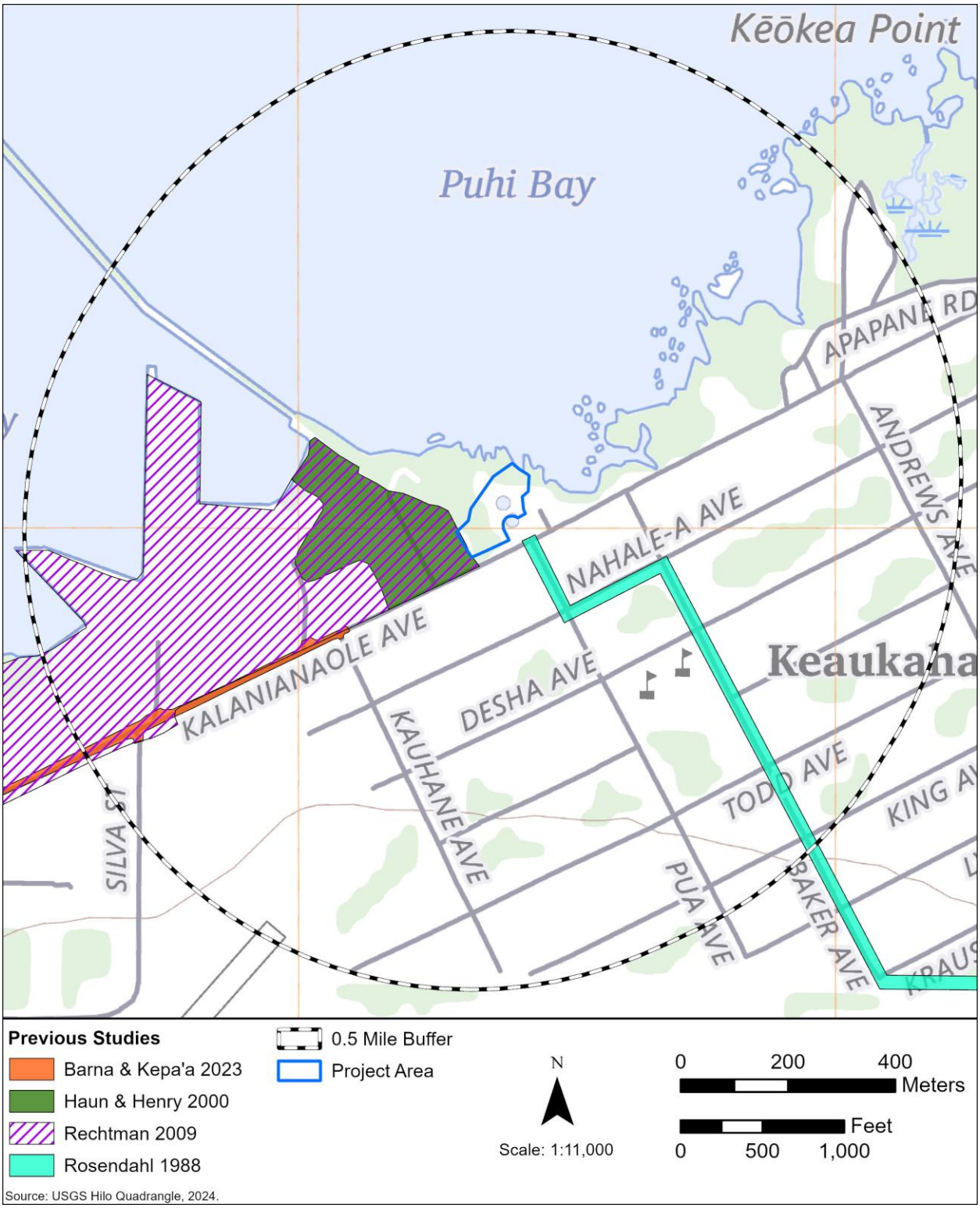


Figure 156. Previous archaeological studies conducted within 0.5 miles of the PACRC portion of the HIFL project area.

Table 23. Previous Archaeological Studies Within 0.5 Miles of the UH Hilo Portion of the HIFL Project Area

Reference	Type of Study	Findings
Borthwick et al. 1993	Archaeological Inventory Survey	Identified four new historic properties associated with post-Contact sugarcane agriculture: SIHP 50-10-35-18667 through 50-10-35-18670, all of which are located within 0.5 miles of the current project area. The sites include an agricultural complex containing two walls and approximately 25 mounds (SIHP -18667); an oval enclosure and adjacent L-shaped wall segment (SIHP -18668); modified outcrop enclosure and wall segment (SIHP -18669); and remnant of a sugar cane field (SIHP -18670). All four sites were assessed as significant under Criterion d and recommended for no further work.
Hunt and McDermott 1994	Archaeological Inventory Survey	Identified a total of 13 historic properties None are located within 0.5 miles of the project area.
Maly et al. 1994	Archaeological Inventory Survey	Identified four new historic properties within 0.5 miles of the current project area: SIHP 50-10-35-19431 through 50-10-35-19434, associated with post-Contact agriculture and habitation. These included two agriculture/habitation enclosure features (SIHP -19431); a complex of 47 wall and mound features (SIHP -19432); a possible temporary C-shaped habitation (SIHP -19433); and free-standing U-shaped wall (SIHP -19434). All four sites were assessed as significant under PHRI category A and recommended for data recovery.
Spear 1995	Data Recovery	Data recovery investigations for the four historic properties identified by Maly et al. 1994; SIHP -19431 through 50-19434. Following data recovery, no further work was recommended.
Robins and Spear 1996	Archaeological Inventory Survey	Identified one new agricultural historic property and added features to three historic properties previously documented by Hunt and McDermott (1994). None are within 0.5 miles of the project area.
Rechtman and Henry 1998	Archaeological Inventory Survey	Identified one new historic property within 0.5 miles of the project area: SIHP 50-10-35-21461, which is associated with post-Contact agriculture and included a total of 117 features consisting of walls, mounds, and enclosures. It was assessed as significant under Criterion d and recommended for no further work.
McGerty and Spear 1999	Archaeological Inventory Survey	Added 13 new features to SIHP -19432. New features included rock walls, mounds, and platforms, and are all located within 0.5 miles of the current project area. The features were considered no longer significant as sufficient data had been collected, and no further work was recommended.
Wilkinson et al. 2010	Archaeological Monitoring	No historic properties identified.

Reference	Type of Study	Findings
Clark et al. 2012	Archaeological Inventory Survey	Identified four new historic properties within 0.5 miles of the current project area: SIHP 50-10-35-29370 through 50-10-35-29373, which are associated with flood control for the Waiākea Stream and sugarcane cultivation for the Waiākea Sugar Company/Hilo Dairy. These included two drainage sites (SIHP -29370 and -29371), an agriculture mound (SIHP -29372), and remnants of the Hilo Dairy (SIHP -29373). All four sites were assessed as significant under Criterion d and recommended for no further work.
Escott 2013	Archaeological Inventory Survey	Recorded a total of 18 newly identified historic properties and one previously identified historic property (remnants of the Hilo Dairy; SIHP -29373) within 0.5 miles of the project area. Newly identified historic properties included modified outcrops (SIHP 50-10-35-29965, 50-10-35-29966, 50-10-35-29969, 50-10-35-29976, 50-10-35-29974, 50-10-35-29976, 50-10-35-29978, 50-10-35-29979, 50-10-35-29980, 50-10-35-29981), rock mounds and piles (50-10-35-29968, 50-10-35-29970, 50-10-35-29971, 50-10-35-29976, 50-10-35-29974, 50-10-35-29975, 50-10-35-29978), platform sites (50-10-35-29979, 50-10-35-29981), rock and linear walls (SIHP 50-10-35-29967, 50-10-35-29972, 50-10-35-29978, 50-10-35-29980), agricultural complexes with terraces, paving, and water-retaining features (SIHP 50-10-35-29978, 50-10-35-29980), boundary features (SIHP 50-10-35-29972, 50-10-35-29977), and a pit feature (SIHP 50-10-35-29982). Five additional features were also added to SIHP -29373 (a multi-room building, foundation of a former barn, small concrete slab, concrete retaining wall, and pile of waterworn rock; Features F through J, respectively). All newly identified sites and features were assessed as significant under Criterion d and recommended for no further work.
Nelson et al. 2017	Archaeological Monitoring	Added one feature (Feature F, a cesspool) to SIHP -29373, remnants of the Hilo Dairy. The feature was assessed as significant under Criterion d and recommended for no further work.

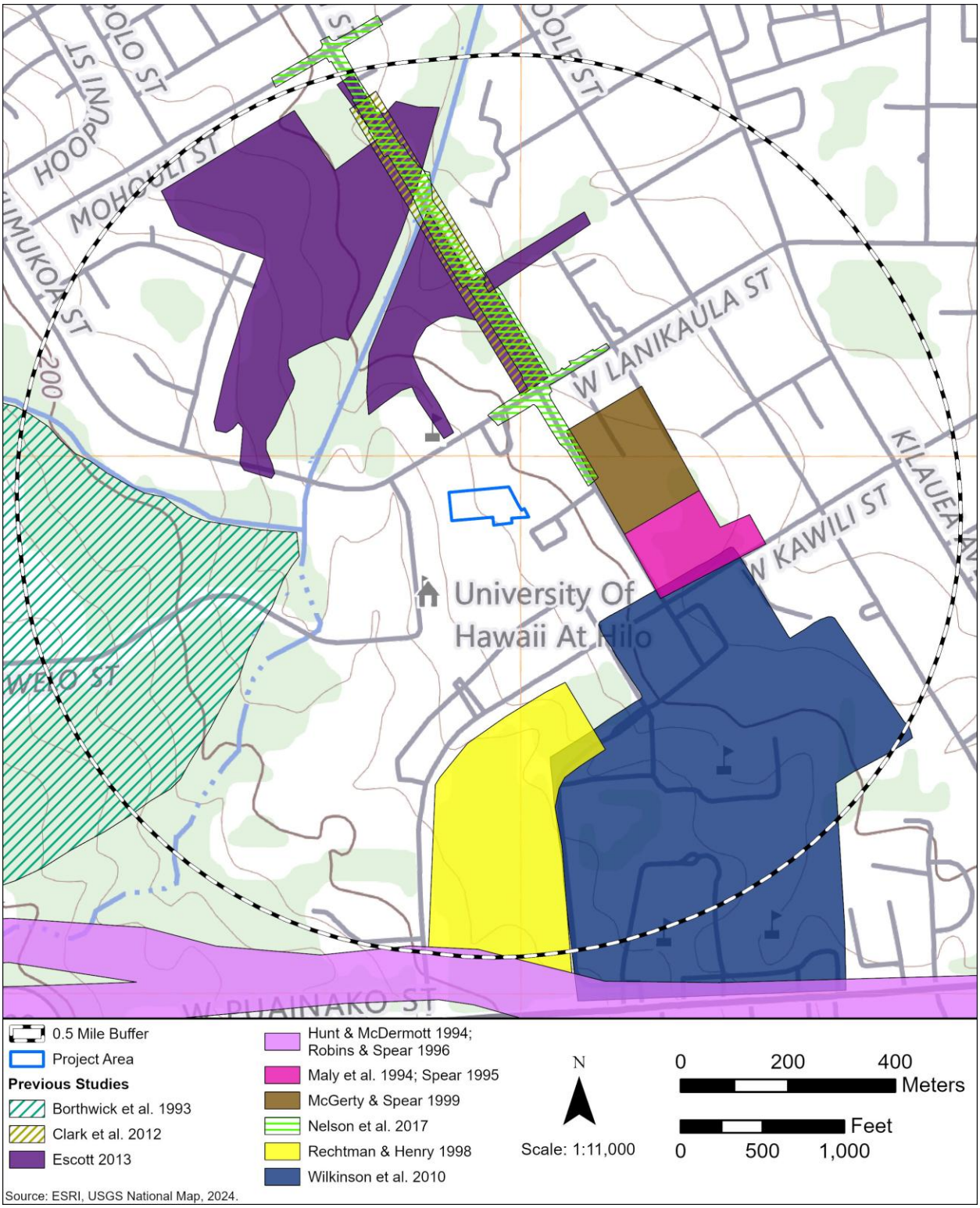


Figure 157. Previous archaeological studies conducted within 0.5 miles of the UH Hilo portion of the HIFL project area.

Table 24. Previously Identified Historic Properties Within 0.5 Miles of the PACRC Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI	HAR	NRHP		
50-10-35-07413	Hilo Railroad Company tracks	Transportation	Post-Contact	-	d	-	No Further Work/ Documentation during future projects	Barna and Kepa'a 2023
50-10-35-07430	Peter Arioli House	Permanent Habitation	Post-Contact	-	-	-	None provided	On File, SHPD
50-10-35-07431	Kahauolopua House	Permanent Habitation	Post-Contact	-	-	-	None provided	On file, SHPD
50-10-35-07437	St. Mary's Gate of Heaven Church	Ceremonial	Post-Contact	-	-	-	None provided	On File, SHPD
50-10-35-07438	Kuhio Memorial Chapel	Ceremonial	Post-Contact	-	-	-	None provided	On File, SHPD
50-10-35-07441	Hilo breakwater	Surf control	1929–1930	-	a, c	-	Preservation	DLNR 1974
50-10-35-07506	Kamehameha Hall	Commerce/Trade	Post-Contact	-	-	A, C	Preservation	Neves 1992
50-10-35-31077	DOT Hilo Harbors	Government Operations	Post-Contact	-	-	-	None provided	On File, SHPD

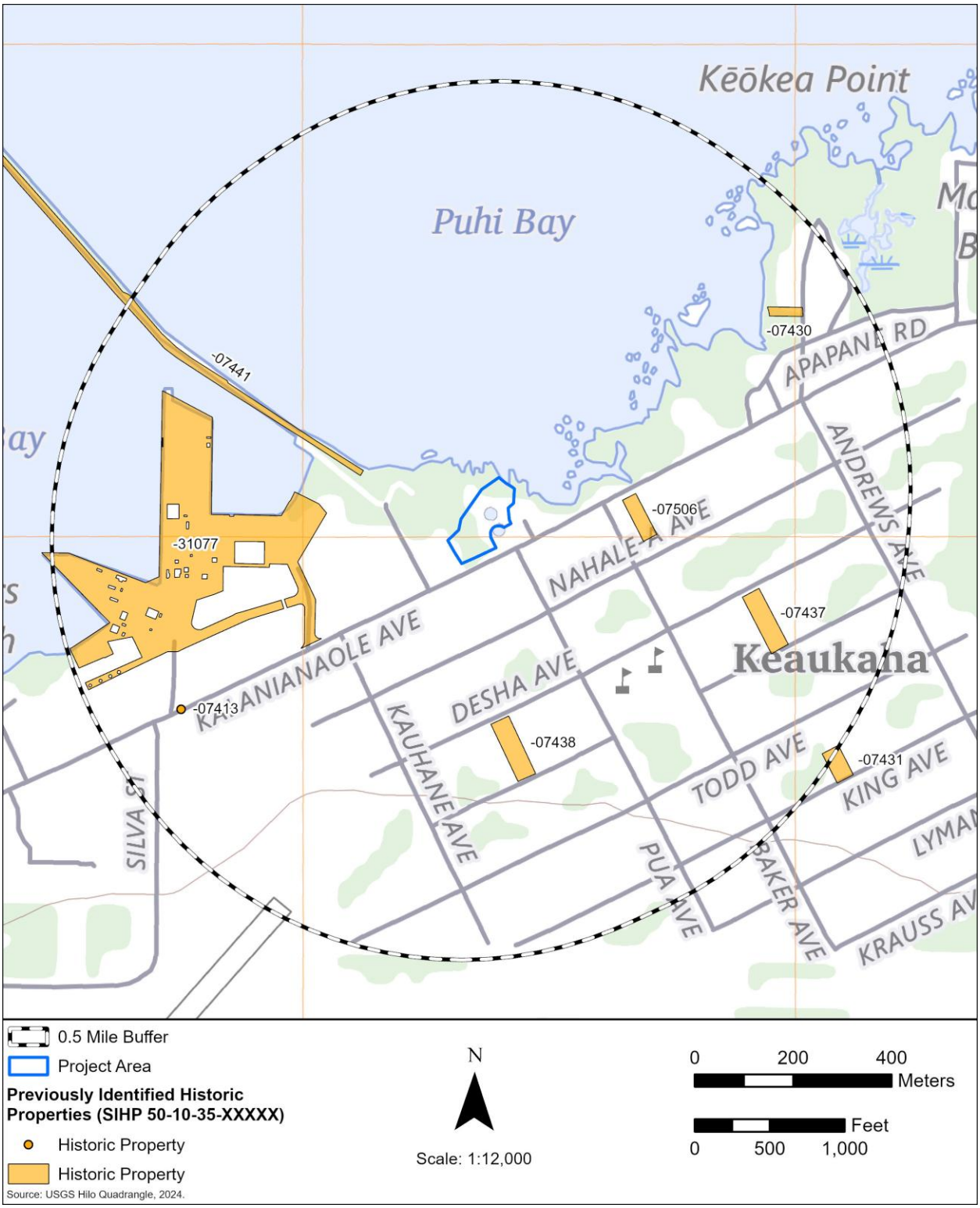


Figure 158. Previously identified historic properties within 0.5 Miles of the PACRC portion of the HIFL project area.

Table 25. Previously Identified Historic Properties Within 0.5 Miles of the UH Hilo Portion of the HIFL Project Area

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-10-35-18669	Enclosure and wall segment	Temporary habitation	Post-Contact	-	d	-	No Further Work	Borthwick et al. 1993
50-10-35-18670	Remnant commercial sugarcane field (Cane Lot #16) with numerous rock clearing features (mounds, piled rocks)	Agriculture	Post-Contact	-	d	-	No Further Work	Borthwick et al. 1993
50-10-35-19431	Complex (enclosure and C-shape)	Habitation; agriculture	Post-Contact	A	-	-	Data Recovery (Maly et al. 1994); No Further Work (Spear 1995)	Maly et al. 1994; Spear 1995
50-10-35-19432	Complex (at least 60 features: mounds, platforms, walls, and enclosures)	Agriculture; possible habitation	Pre-Contact	A	-	-	Data Recovery (Maly et al. 1994); No Further Work (Spear 1995, McGerty and Spear 1999)	Maly et al. 1994; Spear 1995; McGerty and Spear 1999
50-10-35-19433	C-shape enclosure	Temporary habitation	Post-Contact	A	-	-	Data Recovery (Maly et al. 1994); No Further Work (Spear 1995)	Maly et al. 1994; Spear 1995
50-10-35-19434	U-shaped wall	Temporary habitation	Post-Contact	A	-	-	Data Recovery (Maly et al. 1994); No Further Work (Spear 1995)	Maly et al. 1994; Spear 1995
50-10-35-21461	Complex of 117 features	Agriculture	Post-Contact	-	d	-	No Further Work	Rechtman and Henry 1998

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
	(walls, enclosures, and mounds)							
50-10-35-29370	Drainage features related to modifications of Waiākea Stream channel	Water control	Post-Contact	-	d	-	No Further Work	Clark et al. 2012
50-10-35-29371	Earthen ditch	Water control	Post-Contact	-	d	-	No Further Work	Clark et al. 2012
50-10-35-29372	Rock mound	Agriculture	Post-Contact	-	d	-	No Further Work	Clark et al. 2012
50-10-35-29373	Hilo Dairy facilities	Dairy	Post-Contact	-	d	-	No Further Work	Clark et al. 2012; Escott 2013; Nelson et al. 2017
50-10-35-29965	Modified outcrops and rock mound	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29966	Modified outcrop	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29967	Rock wall	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29968	Rock mounds	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29969	Rock mound	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29970	Rock wall	Agriculture	Post-Contact		d		No Further Work	Escott 2013
50-10-35-29971	Rock mounds	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29972	Rock wall	Boundary	Post-Contact		d		No Further Work	Escott 2013
50-10-35-29973	Rock mounds and modified outcrop	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29974	Rock mound and modified outcrop	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29975	Rock mound	Agriculture	Post- Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29976	Rock mounds	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013

Site Number	Type	Function	Age	Significance			Mitigation Recommendation	Reference(s)
				PHRI*	HAR	NRHP		
50-10-35-29977	Fence posts	Boundary	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29978	Complex of 17 features (modified outcrops, terrace, rock walls and mounds)	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29979	Platform and modified outcrops	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29980	Linear walls, modified outcrop, paving and water retaining feature	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29981	Platform and modified outcrop	Undetermined	Post-Contact	-	d	-	No Further Work	Escott 2013
50-10-35-29982	Pit feature with partial fill	Agriculture	Post-Contact	-	d	-	No Further Work	Escott 2013

* Rather than using Hawai'i Register of Historic Places significance criteria, PHRI assigned their own significance categories, defined as follows:
A=Important for information content, further data collection necessary (PHRI=research value);
X=Important information content, no further data collection necessary (PHRI=research value, DLNR-HPP=not significant);
B=Excellent example of site type at local, region, island, State, or National level (PHRI=interpretive value); and
C=Culturally significant (PHRI=cultural value).

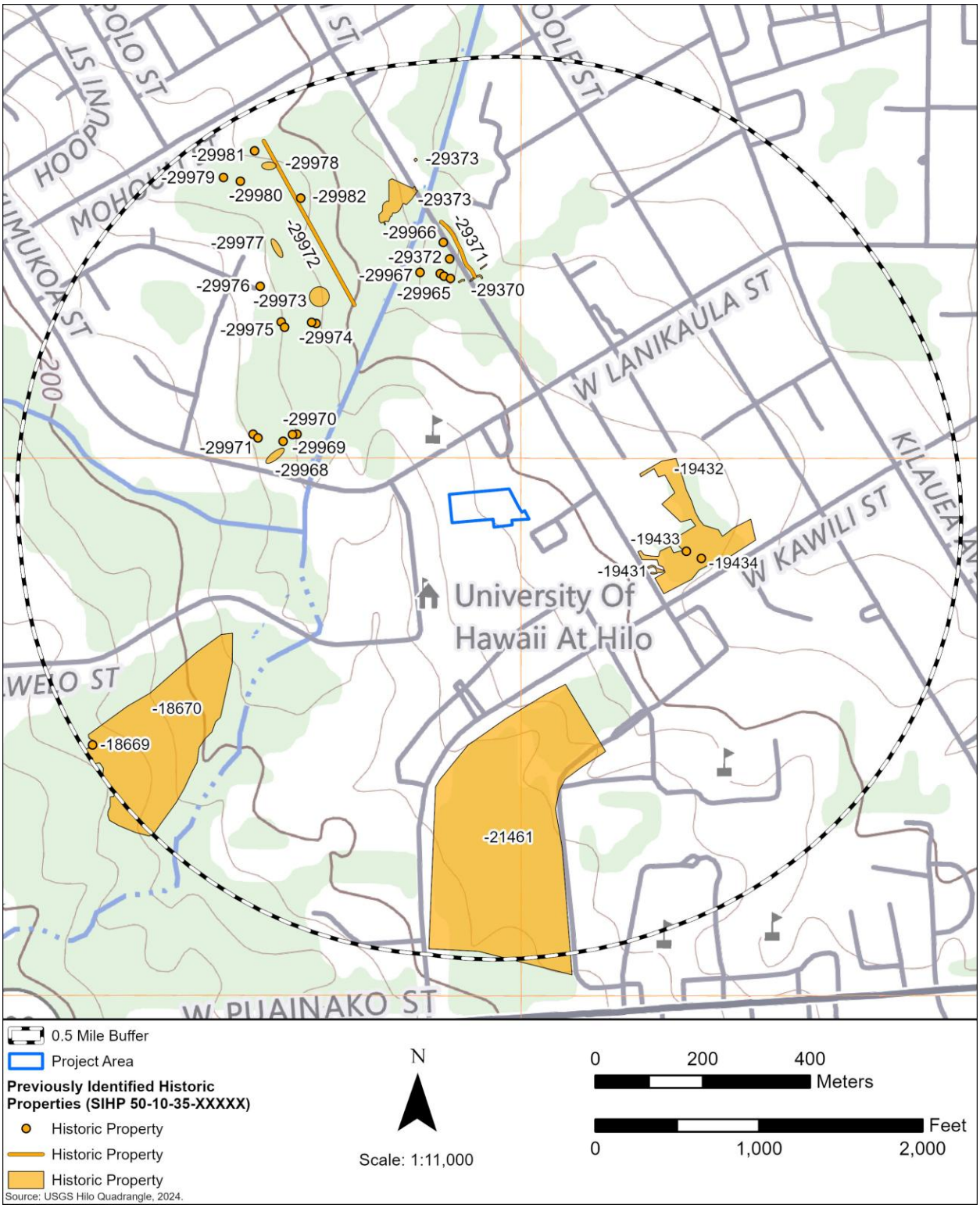


Figure 159. Previously identified historic properties within 0.5 Miles of the UH Hilo portion of the HIFL project area.

3.6.12 Summary of Archival and Background Research for the Hawai‘i Island Cable Landing Site

As Waiākea Ahupua‘a is a large and much-storied place, the current report places an emphasis on the areas around Hilo Bay, Keaukaha, and the UH Hilo campus. This portion of the HIFL subsea cable will come onshore at Puhi Bay, in an area traditionally known as Milo or Puuhomilo. Several *mo‘olelo* are connected with this area in particular. One discusses the supernatural *he‘e* that dwelled at Milo, who would occasionally take one of the children who went to Puhi Bay to swim. Several other stories are tied to the well-known shark hole at Puhi Bay, and the shark *‘aumakua* that would protect those waters and the people of Keaukaha.

Hilo is well known for its frequent rains, which support ample freshwater sources and lush vegetation. Boundary Commission Testimonies make frequent reference to streams, grottos, waterholes, house sites, and cultivation plots with a wide variety of plants under cultivation, including *kalo*, yams, bananas, ti, *māmaki*, and coconuts. In areas where *kalo* could not be planted in *lo‘i*, the *kipi* method of *kalo* planting was used, or *kalo huli* were submerged in water and held upright by lava rock mounds. Hilo was also a major area for *‘ulu* planting, which is further reflected by the *mo‘olelo* of Ulu and Mokuola.

Fishing is also an integral part of life in Hilo Bay, with a wide variety of fishing methods practiced as well as cultivation of fish in ponds, and gathering shellfish, marine invertebrates, and *limu*. At least three different types of *limu* were available in the bay: *limu ‘ele‘ele*, *limu huluhuluwaena*, and *limu ‘aki‘aki*. Fishponds supplied ‘*ama‘ama*, *awa*, *ahole*, and ‘*o‘opu*. During the Kamehameha Dynasty, some of the fishponds in Waiākea were known as the “Royal Ponds,” and supplied mullet reserved for the King. Fishpond ecosystems also supported avifaunal species that are no longer found in the bay, including the endemic Hawaiian duck (*koloa-maoli*), coot (*‘alae*), and stilt (*kukuluāe‘o*), and migratory pintail, widgeon, and shoveler ducks.

Hilo figured prominently during the Kamehameha Dynasty. Kamehameha was living in Hilo in 1794 when Vancouver visited, and later Kamehameha identified Hilo Bay as a favorable place for mounting his attack on Kaua‘i, given the availability of adzes from Mauna Kea, *koa* and *‘olonā* in the inland forests, and ample space to stage his fleet. On Kamehameha I’s passing, Waiākea Ahupua‘a was inherited by Liholiho (Kamehameha II). After Liholiho and Kamāmalu contracted measles in England and passed away within days of each other, they were returned to Hilo Bay by Captain Byron of the HMS *Blonde*. The lands of Waiākea were held by Kaunuohua, granddaughter to Keawemauhili, at the time of the Mahele, and the *ahupua‘a* became Crown Lands. Although there are a number of LCA awards in the coastal region of Waiākea Ahupua‘a, none are located near the Hawai‘i Island portions of the HIFL project area.

Sugarcane cultivation and processing was a booming industry in Hilo following the Mahele, and drove much of the commercial, industrial, and infrastructural developments of the late nineteenth and early twentieth century. The portion of the project area at UH Hilo is in land that was formerly under sugarcane cultivation for the Waiākea Mill Company, which operated from 1879 to 1947. The need to transport sugar from the fields to mills for processing, and from the mills to the harbor for overseas shipping, drove the development of the Hilo Railroad and infrastructural improvements in Hilo’s harbors. In 1955, these former cane lots became a part of UH Hilo’s permanent campus.

The PACRC portion of the HIFL project area is in land that was set aside for the Keaukaha Beach Park by Executive Order 421, during the passage of the Hawaiian Homes Commission Act in 1920.

In 1924, the Keaukaha-Panaewa Hawaiian Home Lands followed the Hoolehua and Palaau Homesteads on Molokai to become one of the first Hawaiian Homesteads established. Hawaiian families were living in this area prior to the establishment of the homesteads, and oral historical interviews conducted by Rhea Akoi (1989) document some of what it was like to live in Keaukaha before and after the establishment of the Keaukaha-Panaewa Hawaiian Home Lands. People recalled living on resources from the ocean and the crops grown in their gardens. Keaukaha became a thriving community, and many of the historic properties in the vicinity of the project area are architectural resources related to this community, including Kamehameha Hall and Kawananakoa Hall, which was completed in 1938 and originally located just to the east of the PACRC portion of the project area. This structure was destroyed during the 1946 tidal wave, and the location of the hall was moved to Baker Street.

In 1966, the Hilo Sewage Treatment Plant was built in the current location of the PACRC facilities. The outfall for the Hilo Sewage Treatment Plant was installed at Puhi Bay, near the breakwater and the PACRC portion of the HIFL project area. Initially, the outfall discharged effluent at a depth of roughly 37 feet. A few years later, this was extended to 4,500 feet offshore and discharged at a depth of 56 feet. The plant significantly reduced the amount of pollutants entering the Hilo Harbor waters, though the waters at Puhi Bay continued to receive the majority of pollutants. In 1993, a new wastewater treatment facility was built near the airport, rendering the treatment plant at Puhi Bay obsolete. In 1998, UH Hilo proposed redeveloping the Old Hilo Wastewater Treatment Plant into the Pacific Aquaculture and Coastal Resources Center. Work on the PACRC began in 2000, and facilities opened in 2005.

Historic properties identified in the vicinity of the UH Hilo portion of the HIFL project area are all post-Contact features, the majority of which are related to past sugarcane cultivation by the Waiakea Mill Company, operation of the Hilo Dairy. In the area around PACRC, previously identified historic properties are post-Contact architectural features and include the Hilo Breakwater, Hilo Harbor, Hilo Railroad Company tracks, Peter Arioli House, Kahauolupua House, St. Mary's Gate of Heaven Church, Kuhio Memorial Chapel, and Kamehameha Hall.

4.0 CONSULTATION RESULTS

4.1 COMMUNITY OUTREACH INTERVIEWS AND RESULTS

Community outreach was completed on both a project-wide and site-specific basis. Following the distribution of letters soliciting participation in the CIA and Ka Paʻakai Analysis for the HIFL Project, as well as the posting of the public notice to *Ka Wai Ola* for the month of May 2025, a total of 29 individuals provided feedback or referrals via email, or were interviewed either via phone or via Zoom. In addition, 20 individuals attended a meeting and shared feedback in person. Appendix A includes lists of individuals who were contacted, their affiliations (where applicable), and participation, if any, in the current CIA and Ka Paʻakai Analysis. Appendix B includes a list of sample questions that were asked during semi-structured interviews for the CIA and Ka Paʻakai Analysis.

4.1.1 Scoping and Community Outreach for the Overall Project

To initiate consultation for the CIA and Ka Paʻakai Analysis, contact was made with a range of government agencies, advisory councils, local community organizations, and individuals with generational ties to each *ahupuaʻa* within which portions of the HIFL project area are situated. The text from the general letter and each of the site-specific letters that were distributed is included in Appendix A, along with a comprehensive list of all individuals, organizations, councils, and agencies who were contacted for this CIA and Ka Paʻakai Analysis. The first round of letters and project area maps were sent via email to individuals and organizations on March 31, 2025. Some of these parties provided referrals to additional individuals for consultation, who were subsequently contacted when possible with letters and project area maps. All letters requested that recipients respond with their interest in participating within two weeks of receiving the letter.

For the overall project, two responses were received. The Office of Hawaiian Affairs responded via email and asked to review the draft CIA. Glen Kila responded via email with comments on two of the sites, the Oʻahu Cable Landing Site and the Lānaʻi Cable Landing Site. Mr. Kila's comments are included in the relevant site-specific sections below.

4.1.2 Kauaʻi Cable Landing Site

One response was received via email from Jan TenBruggencate of the Kaiola Canoe Club providing feedback specific to the Nukoliʻi Beach portion of the HIFL project area. The response was supportive, though expressed concerns about the potential for the project to restrict access to the ocean around Nukoliʻi during project construction. The contents of this email have been reproduced below.

Jan TenBruggencate, Kaiola Canoe Club

Jan TenBruggencate provided comments via email on April 1, 2025, on behalf of the Kaiola Canoe Club:

Aloha Dr. Swift,
Thanks for the opportunity for Kaiola Canoe Club to participate in commenting on the proposed Hawaiian Islands Fiber Link project. I have been asked by the club to respond on its behalf. We have reviewed the provided documents and we are supportive of a project that will improve broadband speed and availability on our island.

As a Hawaiian outrigger canoe club, Kaiola operates out of Niumalu and Nawiliwili but our crews and canoes use the waters offshore of where the cable will come ashore at Nukolii. Our analysis of the supplied information suggests that it should not impact our activities, except possibly during construction.

As an outrigger canoe club, in this vicinity we mainly operate offshore, from a hundred yards to a mile or more from the beach. That said, it is important to the canoe club that this project not interfere with the ability to launch canoes from the Nukolii shore, launch marine rescue operations from the shore, or to land canoes in emergencies. One of our paddlers some years ago made an emergency landing at the Nukolii Beach area after a shark attack disabled his OC1 canoe. Other paddlers have swum ashore here after mishaps at sea.

Any long-term legal restrictions on shoreline use associated with this project would be problematical for the ocean recreation community, including Kaiola Canoe Club. The area of the cable landing is extensively used by recreational beachgoers, anglers, shell collectors, marine debris cleanup operations, scuba and skin divers and others.

Marine wildlife, including but not limited to Hawaiian monk seals and Hawaiian green sea turtles, may also use the shoreline.

There may be historical resources in the area in addition to those indicated in the report you sent, including the World War II era Marine Camp, a former horse racing track, a significant dairy operation (Nukolii), cattle ranching and more than a century of sugar cane growing activities. There were, of course, extensive pre-contact uses of this region, which is famous in legend. Any construction activity should be prepared to preserve and protect archaeological resources.

Again, thanks for the opportunity to comment, and please reach out as needed as this project progresses.

Jan TenBruggencate,
For Kaiola Canoe Club.

4.1.3 Oʻahu Cable Landing Site

A small number of individuals acknowledged receipt of the consultation letter and expressed overall support for the project. Glen Kila responded via email and shared information. Mana Kaleilani Cáceres, provided feedback via a letter. Ulukoa Duhaylonsod of Kaʻuikiokapō was interviewed and shared additional insights into Honouliuli Ahupuaʻa, and potential impacts of the project. This information has been summarized below and incorporated into the background research section of this report where appropriate.

Glen Kila

Glen Kila responded via email on April 1, 2025 and noted the following:

> I have visited and studied the location area with my tupuna Lei, archaeologist Aki Sinoto and zoologist Alan Ziegler. We located several Hawaiian burials, archaeological sites, sinkholes with rare animal bones and a water cave. My recommendation is that drilling be carefully researched and monitored to prevent inadvertent negative impact to cultural sites.

Mr. Kila also provided a referral.

Mana Kaleilani Cáceres

Mana Kaleilani Cáceres responded via email on August 12, 2025 and provided a pdf letter attachment that discussed valued resources and cultural practices. The contents of this letter are reproduced here and it is included in Appendix C:

> Aloha e Dr. Mulrooney,
>
> Mahalo for reaching out to me regarding the Cultural Impact Assessment (CIA) and Ka Paʻakai Analysis for the Hawaiian Island Fiber Link Project, Barbers Point Beach Park Cable Landing Site. I appreciate your consideration of cultural resources and traditional practices in Honouliuli Ahupuaʻa, ʻEwa Moku.
>
> Given the importance of this area to our cultural heritage, I would like to provide the following thoughts and recommendations for your assessment:
>
> **Potential Presence of Burials (Iwi Kūpuna):** The ahupuaʻa of Honouliuli has historically been an area of significance for Native Hawaiian communities. It is essential to consider the possibility of encountering iwi kūpuna during the project, particularly at the onshore cable landing site and along construction corridors.
>
> Protocols for handling inadvertent discoveries should align with state and federal guidelines, ensuring respect and protection of iwi kūpuna.
>
> **Kālua (limestone pits/sinkholes) as Cultural Resources** I would like to reinforce that their significance goes far beyond what they may contain. These limestone pits are ancestral features tied to our identity as kānaka ʻEwa, and their presence represents a continuity of place, practice, and spirituality.
>
> It is not unimaginable that, one day, the people of Honouliuli may return to our documented burial practices, including kanu into these kālua, if protected and respected. What a beautiful restoration of ancestral relationship that would be. This is why these places should be preserved not only as static sites of the past, but as spaces of living potential.
>
> **Cultural Resources and Historic Properties:** The identified historic properties and potential submerged resources, such as the *Arthur* and the *Liliu*, warrant careful documentation and preservation efforts. These resources hold cultural and historic significance and should be treated with sensitivity. Additional surveys to identify pre-contact cultural properties in the project area could be beneficial.

Traditional and Customary Practices: It would be helpful to consider whether any traditional gathering sites or access trails intersect with the project area. Community input may help identify such sites. The late Uncle Mike Lee was an expert on limu and many of his videos are on YouTube and his ʻike should be recognized in this CIA for this project.

Honouliuli Ahupuaʻa holds rich moʻolelo and cultural associations that should be acknowledged. Consulting with kūpuna (elders) and cultural practitioners may provide deeper insights into these connections.

I would be interested to see if/where this project intersects with the leina a ka ʻuhana or the view plane that's associated with this leina.

Environmental Impacts: The offshore habitat includes elements such as coral and limu that are important for traditional practices. Any mitigation strategies to minimize impacts on these ecosystems will be appreciated by the community.

Ka Paʻakai Analysis Recommendations: To protect traditional and customary Native Hawaiian rights, I recommend close collaboration with community members, cultural practitioners, and descendants of Honouliuli, including my ʻohana.

Ensuring public access to findings and facilitating open dialogue will help build trust and respect among all stakeholders.

If additional information or insights are needed, I would be happy to kōkua further. Please feel free to reach out if you would like to schedule a time to discuss this further. I can also provide referrals to other knowledgeable individuals who may offer valuable perspectives.

Mahalo nui loa for your commitment to respecting and preserving our cultural heritage.

Ola nā iwi,
Mana Kaleilani Cáceres

Ulukoa Duhaylonsod, Kaʻuikiokapō

Ulukoa Duhaylonsod responded via email on July 29, 2025. He participated in an interview via Zoom on July 31, 2025 that was conducted by Jillian Swift and Mara Mulrooney.

Ulukoa Duhaylonsod was born and raised in Honokai Hale, on the western side of Honouliuli Ahupuaʻa, near Kahe, Kalaeloa, and West Beach, and has many memories of growing up there before it became developed. His primary concerns were to better understand the nature of offshore disturbance involved in laying the undersea cable, and the onshore disturbance that would occur as the cable came onshore. He acknowledged that the cable itself was relatively small, but noted that the associated infrastructure and project-related disturbance could still have an impact on the reef flats and possibly other portions of the project area.

Mr. Duhaylonsod noted that there is a traditional fishery in this area that the project should be mindful of. The fishery extends from the coast to the deeper waters of the *akule* and *aku*. His organization, Kaʻuikiokapō, and his brother Damon's organization, Hoʻōla Hāniʻo, are actively studying the nearshore resources of Honouliuli, conducting surveys to outplant coral and *limu*. To date, their surveys in Honouliuli to the west of Barbers Point have identified at least 18 different types of *limu*. They currently do not have data for the area around Campbell Industrial Park and

Germaine's Luau, where the project area lies. Mr. Duhaylonsod inquired whether it would be possible for the project to share information from their own marine surveys to help Kaʻuikiokapō with their restoration and protection efforts. He observed that the project has requested that the community share information about the area with them, for example to produce this CIA and Ka Paʻakai Analysis, and that in the same spirit, providing the community with data obtained from marine surveys and other research could be a beneficial reciprocal exchange.

Mr. Duhaylonsod emphasized the importance of hydrology studies to the Barbers Point area, and recommended the project complete a hydrological survey and testing. He recalled that during previous work for the harbor expansion, the limestone cap rock was cracked and millions of gallons of freshwater poured into the ocean. This freshwater source seeps out at certain spots along the coast and supports groundwater-dependent ecosystems. For example, along West Beach, these waters are known to feed nutrients into the coastline, which allows *limu* and other nearshore resources to thrive. The interruption to this balance caused by the harbor expansion had significant and detrimental ripple effects across the entire ecosystem. Providing the community access to the results of this hydrology study would also be a beneficial outcome of the project, and it would assist in restoring traditional cultural practices and resources in this area.

The Kalaeloa Unit Wildlife Refuge is located in Kalaeloa to the east of the project area. Mr. Duhaylonsod noted that *ʻōpaeʻula*, which can be found in the *kālua*, *ʻakoko* (spurge; *Chamaesyce* sp.), and the ʻEwa *hinahina* (*Achyranthes splendens*) were species within this area that could also be impacted by disruptions to freshwater sources. He added that the Water Resource Research Center at the University of Hawaiʻi has been an important resource for understanding these issues, and that they are working with Kaʻuikiokapō and other community members to better understand water resources in this area, including the endangered plants and other resources of the *kāluawai* (limestone pits containing water) that may rely on fresh or brackish water inputs. He stressed that even if it may lack potability, the subterranean water underlying the limestone cap rock is a real and significant resource for the area, upon which many other species rely.

Mr. Duhaylonsod mentioned that earlier archaeological surveys in the Barbers Point area had not comprehensively identified all of the historic properties that remained on the landscape, and that the ʻEwa Plain has a unique geomorphology which requires a historic preservation approach that is tailored to the specifics of that particular region. He cautioned that the landscape was full of limestone pits and that even if there was a road or other development in large portions of the project area, it was likely that many *kālua* still remained. He observed that all the limestone pit features in areas of development were not fully investigated, and suggested that a more effective AIS testing strategy would be to identify and excavate limestone pits within the project area, rather than attempt to trench through the hard coral shelf. Mr. Duhaylonsod added that the cultural, archaeological, and paleoenvironmental significance of the limestone pits had not been recognized until relatively late, when Bishop Museum researchers had identified avifaunal remains of extinct species in the limestone pits, as well as evidence for *kāluamahi*, or traditional agricultural practices in limestone pits, and *kāluawai*, or traditional water access points in limestone pits. Some of the pits were also found to contain *iwi kūpuna*. Summarizing in his words: "the kālua itself is a resource."

Several potential efforts were suggested for the project to mitigate potential impacts. This included sharing information gathered by the project with the community, which could include coastal surveys, hydrology data, or other research. The project could also provide support towards efforts that are already underway to restore the coastal ecosystems through planting coral, *limu*, and

native plants. Mr. Duhaylonsod also pointed out that certain areas of Oʻahu were more likely to be subject to infrastructural developments of this nature, and suggested the project could offer a discount to fiber end users that are part of the neighboring community.

4.1.4 Maui Cable Landing Site

Two responses to outreach for the Maui Cable Landing Site were received. Roselle Bailey provided feedback via a telephone conversation, which is summarized below. Burt Lum responded via email and was interviewed.

Roselle Bailey, KaʻImi Naʻauao O Hawaiʻi Nei Institute

Roselle Bailey provided feedback via a telephone conversation with Jillian Swift on April 11, 2025.

Roselle Keliʻihonipua Bailey has lived in Paukukalo along a channel of the Wailuku River for around 25 years. From there, she is able to observe the landscape, the river currents, and the birds. During storms and heavy rains, the waters from the Wailuku River runs into Kahului Harbor, often carrying with it the polluted waters from the streets and other developments. She observed that many of the people she once knew in this area had passed on, and the surrounding neighborhood had changed a great deal, including the development of large, gated private properties. The people in this area no longer fish or gather *limu*, and their food base is very different from traditional Hawaiian foodways.

She shared her belief that Hawaiian culture and Native Hawaiian rights are often ignored in governance, technology, and development because "they don't eat what we eat." Though it may seem small, this difference reverberates into the landscape. For instance, the *ʻauwai* systems are no longer maintained, which served an important role in filtering the water that flowed through them, and in nourishing the landscape. Today, they don't eat food that comes from the channeled river, because the water has become polluted.

Ms. Bailey's concerns about the project can be summarized into four main points: (1) concerns about the cleanliness of the environment, and whether the project will, or has the potential to, introduce new contaminants into the nearshore ecosystems; (2) what may happen in a 'worst-case-scenario,' and how the project will be equipped to handle such emergencies and ensure that the area is not exposed to further contamination; (3) how the project and its related activities will impact the fishermen, canoe clubs, and other people who use this area for fishing, canoe racing, and other traditional cultural practices; and (4) how the project will maintain transparency and communicate information to the community throughout its duration, and particularly in the event of an emergency.

Burt Lum

Burt Lum responded via email on April 2, 2025 expressing interest in participating, and noted that he has knowledge of all of the proposed landing sites. He was interviewed by Jillian Swift via Zoom on May 2, 2025.

Burt Lum was hired in 2018 as the State Broadband Coordinator to start the broadband initiative in order to get funding to install a cable landing in Kakaʻako. The HIFL network, in his opinion, is going to be the newest inter-island fiber project. Previous inter-island fiber projects have been in operation close to 25 years and they are reaching the end of their life expectancy. The HIFL project is well received as a brand-new alternative to what currently exists. These cable landings also offer the opportunity to connect trans-Pacific fiber. They not only help service inter-island fiber connections, but also any kind of potential future trans-Pacific fiber networks.

Mr. Lum is familiar with most of the landing locations, but has not spent a lot of time at each particular location to better understand the cultural activities that might take place. In his opinion, most of the landing locations are already established and developed, and from a cultural impact standpoint, he does not think the project would have much of an impact. He thinks it is a good project and would have a positive impact on the future connectivity requirements throughout the state. He believes that boat traffic could potentially be problematic near the landing locations, but that the locations were decided upon because they do not have heavy boat traffic. The installation of the fiber cables will involve horizontal drilling to minimize impact.

4.1.5 Molokai Cable Landing Site

Five people responded to our consultation letter for the Molokai Cable Landing Site and provided feedback or referrals via email. No interviews were conducted with participants who responded to our initial outreach, but Sheron Maile Sasada identified activities being carried out in the vicinity of the portion of the project area at Molokai Yacht Club via email and provided referrals. Teave Heen provided a formal letter as an email attachment. A summary of information received from consultation responses is presented below.

Sheron Maile Sasada

Sheron Maile Sasada responded via email on March 31, 2025, and identified past and present land use surrounding this *ahupuaʻa* as canoe practices and races, fishing, and swimming. She recommended the project team reach out to the canoe clubs that utilize the area around Molokai Yacht Club and provided contact information for the Molokai Canoe Club and Waʻakapaemua Canoe Club.

Teave H. Heen

Teave Heen responded via email on April 8, 2025 and provided a pdf letter attachment that discussed valued resources and cultural practices. The full contents of this letter are reproduced here, and it is included in Appendix C:

> Aloha kākou,
>
> My name is Teave Heen, and I submit this testimony in strong opposition to the proposed Hawaiian Islands Fiber Link Project, specifically regarding the disturbance of our natural marine habitats. As a lifelong paddler and a descendant of generations who have relied on the ocean for sustenance, I stand firmly against any desecration of Kanaloa through the laying of foreign cables or any form of oceanic excavation.

I was raised in a family that lived sustainably off the fish from the sea. My father was a fisherman, and our daily lives revolved around the rhythm of the tides, the abundance of our fisheries, and the sacred responsibility to protect our marine ecosystems. The ocean is not just a resource, it is our identity, our ancestor, and our provider. To disturb it in the name of technological expansion without proper regard for its sanctity and balance is an affront to our cultural, spiritual, and environmental values.

I am a lifelong paddler who has navigated the Kaiwi Channel from Hale o Lono, Molokai, to Oahu, experiencing firsthand the strength and sacred nature of these waters. I have spent my life paddling, surfing, fishing, and diving in these very waters. Iam intimately familiar with the marine ecosystems that are now threatened. This is not just a place of transit, it is a place of deep cultural connection, subsistence, and history for myself and many others who rely on these waters.

Not only have I paddled the Kaiwi Channel where this cable is also planned to lie, but I have also paddled across all the channels connecting our islands; channels that are now under threat by this project. These channels, including the ʻAlenuihāhā, Pailolo, ʻAuʻau, Kalohi, and Kaiwi, are lifelines of our ancestors and remain sacred pathways that connect our islands and people. They are not just bodies of water; they are storied spaces imbued with mana, where generations of Native Hawaiians have traveled, fished, and survived. On each paddle, I have witnessed marine life thriving in their free habitat; dolphins dancing in the waves, honu gliding beneath the surface, and vibrant schools of fish that sustain our people. These creatures, and the delicate ecosystems they inhabit, will be irreparably harmed by this intrusion.

Scientific research has shown that the installation of submarine cables can significantly disrupt marine environments. The process often involves disturbing seabed habitats, leading to sediment resuspension and habitat degradation. Such disturbances can have cascading effects on benthic organisms and the broader marine food web. Additionally, the electromagnetic fields (EMFs) emitted by these cables may interfere with the navigation and communication of sensitive marine species, potentially altering their natural behaviors.

Furthermore, Hawaiʻi already has multiple existing fiber-optic cables in place, connecting the islands and linking Hawaiʻi to the rest of the world. Rather than laying new cables that will further disrupt the ocean floor, the state should focus on upgrading, repairing, or repurposing the infrastructure that already exists. Why disturb more of Kanaloa when viable alternatives exist?

The Kā Paʻakai framework requires a thorough analysis of the cultural and environmental impacts on Native Hawaiian practices and resources. This project, which involves digging into the ocean floor and laying industrial infrastructure in our sacred waters, directly violates our rights to access, protect, and sustain the marine resources that have nurtured us for generations. The proposed activities threaten the delicate ecosystems that sustain our fisheries, impact traditional gathering practices, and contribute to the ongoing desecration of Kanaloa, an act that goes against everything our kupuna have taught us about mālama ʻāina.

Instead of investing in the destruction of our marine environments, the $300 million in federal funding should be directed toward areas of greater need; such as improving last-mile infrastructure to directly benefit underserved communities, enhancing existing collaborations, and removing old, unused cables that continue to litter the ocean floor. This would reflect a true commitment to sustainability rather than the unnecessary expansion of damaging infrastructure.

The government and corporate entities pushing for this fiber link must be held accountable for the irreversible damage they intend to inflict on our ocean. Alternative solutions must be sought; ones that do not sacrifice the health of our waters and marine life for the sake of technological advancement.

I urge decision makers to uphold their duty to protect the rights of Native Hawaiians and our environment. Reject any proposal that disregards the cultural, spiritual, and ecological significance of Kanaloa. Our ocean is not an expendable commodity; it is our home, our history, and our future.

Me ka ʻoiaʻiʻo,
Teave H Heen

4.1.6 Lānaʻi Cable Landing Site

Prior to mailing out consultation letters for the Lānaʻi portion of the HIFL project area, Pacific Legacy consulted with Kepā Maly (Kumu Pono, LLC) via email in April 2024 to identify knowledgeable individuals that should be contacted for consultation. Letters were emailed or mailed to referrals provided by Mr. Maly, as well as additional individuals identified through consulting the U.S. Department of the Interior Native Hawaiian Organization list, Aha Moku Council, and subsequent referrals. Email correspondence was maintained with Mr. Maly and the contacts he identified via a group email thread, Pamela Alconcel (Lānaʻi Education Center), Benjamin Ostrander (Pūlama Lānaʻi), Shelly Kaleialoha Preza (Lānaʻi Cultural & Heritage Center), and Diane Preza (Pūlama Lānaʻi; Maui/Lānaʻi Island Burial Council). Glen Kila also responded via email with comments specific to the Lānaʻi Cable Landing Site.

Kepā Maly, Kumu Pono, LLC; Pamela Alconcel, Lānaʻi Education Center; Benjamin Ostrander, Pūlama Lānaʻi; Shelly Kaleialoha Preza, Lānaʻi Cultural & Heritage Center; and Diane Preza, Pūlama Lānaʻi, Maui/Lānaʻi Island Burial Council (Group Email Thread)

Kepā Maly responded via email to an initial outreach email for the project from Jillian Swift on April 15, 2024 and copied Pamela Alconcel, Benjamin Ostrander, Shelly Kaleialoha Preza, and Diane Preza.

Kepā Maly is a Cultural Ethnographer and Resource Specialist at Kumu Pono, LLC. Mr. Maly shared a folder of resources on Mānele from his many years of working in the area. These resources form the backbone of this report. Diane Preza and Benjamin Ostrander responded via email and offered their assistance in outreach for the project.

Jillian Swift responded to the group email thread when outreach was initiated for the CIA and Ka Paʻakai Analysis on March 31, 2025 and summarized feedback that had been received via email in April 2024. The group email thread noted that Mānele was a known burial area, and that *iwi kūpuna* had been disturbed during previous projects at Mānele, including construction activities for the small boat harbor. The group identified the possible presence of *iwi kūpuna* in the project area as the primary concern for potential project impacts. They recommended that a *kamaʻāina* representative with generational ties to Lānaʻi be on site as a cultural monitor during construction activities. Pamela Alconcel inquired as to whether any of the participants in the group email chain had walked the area. On August 18, 2025, Mara Mulrooney responded to the group to share the

results of Pacific Legacy's field inspection that was completed in February 2025. No further feedback was received.

Glen Kila

Glen Kila responded via email on April 1, 2025, and noted the following:

> In the past, I have visited the location near the harbor and researched a Hawaiian unu temple dedicated to Kanaloa with Dr. Barros. I recommend that no drilling be executed 40 ft from the temple because of its high cultural sensitivity.

4.1.7 Hawai'i Island Cable Landing Site

Three individuals with generational ties to and in-depth knowledge about Waiākea Ahupua'a were interviewed via Zoom. The project team also consulted with DHHL beneficiaries, as a portion of the project area lies within DHHL lands and will require an easement. A summary of consultation responses and information gathered from interviews and meetings is provided below.

Dr. Halena Kapuni-Reynolds, Keaukaha Historian and Former Community Member

Dr. Halena Kapuni-Reynolds responded to our inquiry on April 1, 2025, and was interviewed by Jillian Swift via Zoom on April 17, 2025.

Dr. Kapuni-Reynolds was raised in the Hawaiian Homestead Community of Keaukaha, and also attended school in the community's Hawaiian Charter Schools, Ka 'Umeke Kā'eo and Ke Ana La'ahana. His dissertation (Ph.D., American Studies, University of Hawai'i at Mānoa) synthesized publicly available information to reconstruct aspects of Keaukaha's coastline history within the broader context of Waiākea Ahupua'a (Kapuni-Reynolds 2024). Information from this interview, along with Dr. Kapuni-Reynolds' dissertation and previous publications, were heavily utilized in the production of this report and have also been incorporated into the background research section as relevant.

The conversation focused primarily on the portion of the project area at PACRC. The traditional name for this area is Milo. Dr. Kapuni-Reynolds noted that there are accounts that describe subterranean lava tubes that extend inland from Milo to a place called Kahiolo in the Pana'ewa forest, near the mauka edge of Honohononui and intersecting with the old Puna trail. These subterranean waterways were also used by sharks to travel around the island. The rugged coastal area fronting PACRC includes an area colloquially known as Piggy's Point, named for Uncle Piggy Kaleohano, who camped there with his family every summer. As the project area is close to a Hawaiian Homestead community, this part of the coastline has been used for subsistence and other traditional cultural practices for generations. For example, *Ka Uluwehi o Ke Kai*, by Edith Kanaka'ole was inspired by Keaukaha and "the days she would go out in the early morning with her children and grandchildren to pick the bounty of the ocean," which was right outside her house in Keaukaha. Edith Kanaka'ole's homestead was located across the street from Milo and PACRC. It was in that area that the song was inspired.

Dr. Kapuni-Reynolds identified several important place names in the Keaukaha area that were missing from our map (see Figure 130): ʻAuwili, Awaau, Ka Lua Manō O Kaholeakāne, Kulapae, Milo, Na Maka o Hauiki, ʻOhiʻalolo, Palekai, and ʻUhu Nui. Information from our conversation about these significant places has been incorporated into the background research section of this report. Regarding Ka Lua Manō O Kaholeakāne, he noted that Kaholeakāne was a shark that was seen as an *ʻaumakua* for Kalaniʻōpuʻu and other families in the area. Luka Kanakaʻole talked about the practice of *kahu hānai*, feeding the shark and treating it as a relative, into at least the 1930s (Akoi 1989). He also mentioned the small island overgrown with *hau* at Puhi, which contains the remnants of a stone structure that Alfred Hudson (1932) described as a burial vault in *The Archaeology of East Hawaii*. He stated that in the stories he had heard, it was a *heiau*. He suggested it was related to the shark Kaholeakāne, given its proximity to the shark hole.

He also related the story of Ka Wahine Heʻe O Puhi, the *kupua heʻe* that lived in the tide pools of the area and would snatch children who swam in the pools (also see Akoi 1989). This is a story that Dr. Kapuni-Reynolds tells frequently on his tours in Keaukaha, and cited it as a good example of how *moʻolelo* contain important information about a place. In this instance, he suggested the story may be explaining how this area was probably not a safe place for children to be unsupervised. It also provides an indication of how the landscape used to look: the *moʻolelo* includes mention of tide pools, a hill called Milo, and the subterranean lava tubes that travel inland to the forest. He observed that most of the tide pools in the area have since been filled in.

Dr. Kapuni-Reynolds identified several historic buildings that were of significance to the Keaukaha community. This included Kamehameha Hall, Kawananakoa Hall, and Emma ʻAʻima's beach home, Kailana, which served as an early community meeting house.

He acknowledged that the area had undergone a lot of development over the decades which had changed the landscape, but nevertheless traditional cultural practices continued in the area. Even after the raw sewage treatment facility was built, the coastline continued to be used for fishing. The waters by the PACRC facility, near where the pipe extends into the water, is an area that people took great efforts to clean up so that they could swim there. Dr. Kapuni-Reynolds noted that there could be impacts to contemporary fishing practices from the project. *Hoʻomoana*, the practice of being out in the coastal areas for camping or otherwise spending time in this space, may also be impacted by project activities. He suggested the Keaukaha Canoe Club has a home base by the breakwater and that the project may also impact *waʻa* and canoe club activities. He observed that there were areas in Puhi Bay that still had *limu ʻeleʻele*, and that the project could impact *limu* collecting practices. Puhi Bay is also a place where people scatter the ashes of their loved ones. He also observed that the County was in the process of making improvements to sewage pipes in the area, and wanted to know if the HIFL project would have an impact on planned improvements to sewage treatment infrastructure in the area.

To help mitigate these potential impacts, Dr. Kapuni-Reynolds emphasized that clear communication about project plans was important. For example, it should be clear to the community exactly how the cable will transition from ocean to land, and if the cable infrastructure would have visible and permanent impacts in spaces people frequent regularly. He also suggested interpretive signage, and that research outcomes from the project be shared to benefit the community. For example, the history of the wastewater treatment plant and its later conversion to PACRC is not widely known. He added that the project-based approach is not structured to build community relationships, and this often results in community voices being ignored or altogether

left out of project decisions that would benefit from their input, including the ways projects identify and mitigate potential impacts.

Dr. Kapuni-Reynolds also provided referrals to other individuals that should be contacted for this study.

Lokelani Brandt

Lokelani Brandt responded to our inquiry on April 8, 2025 and was interviewed by Jillian Swift via Zoom on April 24, 2025.

Lokelani Brandt is a *kamaʻāina* of Waiākea with an interest in the Hawaiian cultural history of Waiākea and Hilo. She was born in Kailua, Oʻahu, and moved to Hilo with her family when she was six years old. She grew up in Kaumana, but attended school in Keaukaha through sixth grade and spent a lot of time in Keaukaha. She has spent the majority of her life in Hilo and specifically in Waiākea, and is a current resident of Waiākea. As the owner of Hoaʻāina Heritage Services, LLC, she has studied and written about the cultural history of the Hilo area, including Keaukaha. She observed that Keaukaha has long been overlooked in academic and technical publications, and that few studies have been done in Keaukaha, including for archaeology. Much of the information that has been written about Keaukaha comes from sources like Rhea Akoi's book (Akoi 1989).

Lokelani explained that Keaukaha is a name given generally to the coastal section of Waiākea near the project area, and that its boundaries vary depending on who you ask. The area around PACRC is known as Milo, and there used to be a small *puʻu* there. The *puʻu* at Milo was the place where the storied *kupua heʻe* lived, who would frequent Puhi Bay and sometimes snatch children, until one of the children's grandfather rallied the community together to build a big fire to burn the *kupua*. She also discussed the shark deity Kāneialehia, who was known to patrol the waters of Puhi Bay and around Milo. People took care of the shark, probably as early as the 1700s or perhaps even before, and the shark was considered a "good mano," and not a *mano ai kanaka* (man-eating shark). The shark looked after the people and the people looked after the shark. She also observed that the legend of Laukaieie talked about an underground freshwater spring/lava tube that emerged at Milo. This was one of the areas where freshwater would come up, and where families could go to collect fresh water. The many freshwater springs along Keaukaha made the water in this area cold and less salty.

Near Milo, there was an old trail that passed through the area, which Edith Kanakaʻole talked about Milo being on the makai side of, and which Lokelani suggested could be a part of, the old Puna trail. However, she also observed that much of Hilo's history and its early development had been erased from the landscape, which could sometimes make it difficult to tie this history to tangible landmarks.

The neighboring lands around the PACRC Hilo portion of the HIFL project area are DHHL lands, and Lokelani talked about how families from Keaukaha and Panaʻewa would come to this coastal area to camp for months at a time, usually starting when school would let out until Labor Day. Camping activities during the summertime were large and organized, with systems in place to help decide which families would camp in which spots. This area was and continues to be used for camping, for fishing, and gathering. Canoes would come into the part of the bay that the project area is facing, and families from Keaukaha would launch canoes from this area to scatter ashes at sea. She emphasized that this area, and the entirety of Puhi Bay, is a culturally rich and heavily used space.

In addition, the local schools including Keaukaha School, Ke Ana La‘ahana, and Ka ‘Umeke would use the Puhi Bay area for teaching and student activities, and viewed Puhi Bay as a sort of extension of their classrooms. She expressed a strong desire that those practices not be interrupted or hampered by project activities.

Lokelani also asserted that it was important for the community to have a clear and transparent understanding of the project undertaking, and how the cable installation and operation could impact the landscape and cultural activities. She raised concern about drilling and trenching in the ocean, noting that these ecosystems are fragile and it can take a long time for them to recover from disruption. She hoped that the project would consider alternatives to drilling for laying the cable, and that they would choose the least impactful method for installation. She talked about this area, prior to the development of PACRC, being home to a sewage plant. When she was going to school, she remembered the area being very stinky. On low tide, the smell was even worse. She is glad that the sewage plant is no longer there, though the community still faces challenges with wastewater management and other developments. She stressed that the bottom line was that she hoped the project would consider these kinds of potential impacts to the community and design the project to have the least amount of impact to people and the ocean.

Lokelani was less concerned about potential impacts in the UH Hilo campus portion of the project area, observing that this area had already undergone a significant amount of development and disturbance, though there were likely some pockets of undeveloped lands in the vicinity. She noted that that area would have been a forest pre-Contact, and that the Waiākea Mill operated there post-Contact through the mid-1900s. After the mill shut down, many of those parcels were sold off and became grants. Most of the nearby features that had been documented archaeologically were related to the sugar plantation, and she noted that even those had mostly been removed for further developments, including veterans housing. However, she did express concerns about a private company profiting from a State-owned facility like UH. She noted that Waiākea is Crown Lands, and that a portion of the lease revenue from any private project on Crown Lands should be going back to the State and to benefit Native Hawaiians.

The major concerns identified by Lokelani included ocean drilling and private profit from the usage of Crown Lands. She expressed a desire to see mitigation in the form of restoration work for any potential impacts on coral and other nearshore habitats, perhaps by working with UH to support research or other ocean restoration initiatives. She added that the Keaukaha community, especially the Hawaiian Homesteads, would be the best people to determine the scope of potential impacts and desired mitigation efforts.

Lokelani also provided resources for cultural historical background research and referrals to other individuals who should be contacted for this study.

Dr. Lehua Veincent

Dr. Lehua Veincent responded to our inquiry on June 30, 2025 and was interviewed by Jillian Swift via Zoom on July 18, 2025.

Dr. Veincent’s grandmother on his father’s side, Lucille Kahauolopua, was born and raised in Keaukaha and he lived there until he was around two years old, when his family was displaced from Keaukaha and moved to Pana‘ewa when the airport strip was built. Kahauolopua House (SIHP 50-

10-35-07431) was his grandmother's house, and he remembered being there when he was young, and that the ocean was their background: it was where they played, where they fished, and where they camped. His grandmother was the last one to carry the Kahauolopua name.

Dr. Veincent described camping in Keaukaha every summer, and remembered that when they used to camp, they would take good care of the area. His uncle Ungi, who had a job with the Hawai'i Telephone Company, set up a party line at the camp so that the kids would be safe to camp on the beach and watch the nets while their parents were at work. Although there were large numbers of people who would camp in this area over the summer, they had systems and rules in place to make sure their cumulative impact was still minimal. This included an understanding of what could be fished for and what could not be fished for, and that fish nets should have eyes of a certain size, to make sure fish were able to replenish. When they gathered *limu kohu*, they knew to cut the *limu*, like grass, so that it was able to regrow. When *limu kohu* is pulled, it does not regrow. This is part of the reason that there is no longer *limu kohu* in the area, because these protocols and practices are no longer maintained.

Dr. Veincent observed that there used to be plentiful and easily accessible *limu* on the *laupapa* (reef), and there were many who would pick *limu* in Keaukaha in 1970s and 1980s. In 2006, one of his students observed that there was no longer any *limu* growing underneath the *laupapa* in Keaukaha and conducted a *limu* restoration project. One of the outcomes of this project was recognizing that the reefs had been impacted to the point that it was unlikely they could be restored to what they had once been. However, he also acknowledged that even if the reefs are not as plentiful as they once used to be, if there are not as many reef fish or *limu* or other resources in the area, they are still an important part of that ecosystem and should be protected from further impact. He noted that there was still *limu 'ele'ele* in Keaukaha, but that *limu kohu* and other different kinds of *limu* were no longer there. He also mentioned that he does not hear about people gathering *limu* much anymore.

He discussed the importance of the splash zone as a key ecosystem for littoral resources like *hā'uke'uke*, *wana*, *'opihi*, *kupe'e*, and *pipipi*. He remembered being able to easily see things like *wana* and *'opihi* from the shore, and that they were as close as 10 feet to land. This made it easy to go to the coast to gather intertidal resources. Now the flow of water in this area has changed, and there is no longer a strong splash zone close to the shore. The *wana, 'opihi* and other littoral species have now moved deeper into the ocean, and have become less abundant and less accessible. He also mentioned the *'ōhua*, a kind of transparent *manini*, that lives in the mucous bag of the *koholā* (*palaoa*, sperm whale; *Physeter macrocephalus*). When the *palaoa* came near shore, it would release the *'ōhua*, which would then swim inland into the brackish water ponds for safety. It was in these ponds that the *'ōhua* could be gathered with nets. Once caught, the *'ōhua* could be thrown onto the grill and snacked on like "Hawaiian popcorn." The *'ōhua* were once abundant in the brackish water pools but their populations have also diminished, likely alongside impacts to deepwater species like the sperm whale.

Dr. Veincent noted that fishing practices would often be territorial, in that each family had certain spots that they would always go to for their fishing. He also discussed the Pakele family, who would walk the entire strip of Keaukaha, and along the way take the *wana* and *limu* and anything else he had caught and put it into a bag and place it in one of the cool freshwater ponds on the shore of Keaukaha. When he had reached the other end of the strip, someone would be there to pick him up and they'd travel backwards, collecting all of the bags of food that had been left in the freshwater ponds. He recalled swimming in the freshwater ponds when he was small, and even though many

were on private land, everyone in Keaukaha knew which ponds they could swim in. Most of those ponds have now been destroyed by private housing developments.

He remembered there used to be a pavilion at Puhi Bay, where many different types of gatherings and celebrations occurred. His parents were married at the pavilion in the early 1960s. This was also the area where Hawaiian Village used to be. His grandmother used to sell lei there, and he had fond memories of her bringing him with her to Hawaiian Village and keeping him in a box ("like a puppy") where he could stay safe while she sold her lei. Sometimes they would have military days at Hawaiian Village, and everyone else would have to plan their shopping around the days that they would bus in people from the military camps and give them exclusive access to shop there. When it stopped being used, the area became overgrown and the pavilion was taken down. Dr. Veincent and his family would camp just below where Hawaiian Village was.

Dr. Veincent was surprised to see Kahauolopua House, the house that he grew up in, on the post-Contact features map that was created for the project. He discussed doing archival research at the Hawai'i State Archives with Huihui Kanahele-Mossman in 2000, after having just established the charter school Ke Ana La'ahana. They had been searching through the archives with little success, until they were almost ready to leave and couldn't remember if either of them had checked the last four-drawer filing cabinet in that section. All the way in the back of the cabinet drawer was a miscellaneous Hawai'i Island folder, which contained Nālimu's place names document. He and Huihui Kanahele-Mossman, with help from others at the Edith Kanaka'ole Foundation, translated this document from *'Ōlelo Hawai'i*. This document contained a number of place names, including Milo, that were not recorded on other maps or resources, and brought them back into community memory. He recalled growing up in Keaukaha in the 1960s, and walking this area while growing up, and listening to the stories of *kūpuna*, including Aunty Eleanor Ahuna, who knew much about the latter parts of Keaukaha. All of these experiences gave him an understanding of Keaukaha and the storied places and practices that it holds.

He also discussed the significance of the name Byron's Bay, and described how people lined the entire coast when the *HMS Blonde* stopped in Hilo to tell people about the passing of the King and Queen. Liholiho was from Hilo and Kamāmalu was from Kawaihae. When Byron's ship arrived, everyone gathered began to wail, and their mourning was so loud the cries could be heard in Honolulu.

Dr. Veincent voiced several concerns about potential project impacts, including whether the project could impact the freshwater and brackish ponds along the shore that Keaukaha has become known for, and possible impacts to the reef. He also raised concerns about onshore impacts during construction activities like trenching. He observed that although it may be easy to recognize the direct areas of impact during a project, the surrounding areas may also be affected. As an example, he brought up a repaving project, where the surface to be repaved was getting scraped up, and some of the larger rocks were moved to a separate area so they would not be impacted by the resurfacing. However, the areas where these larger rocks have been moved to are now being impacted by the accumulation of rocks and rubbish mounds. These rubbish mounds can have negative consequences for their surroundings, including killing the vegetation underneath and around them. Every time dust walls and rubbish mounds are moved around the project area and surroundings, it can expand these impacts across larger areas. He suggested the project should be mindful of often overlooked impacts such as these, especially as project activities could damage the reef ecosystem.

Dr. Veincent acknowledged that development was inevitably going to happen, but that there were ways for projects to be managed so that they can be done in an ethical way that is respectful to the people of that place. He emphasized the importance of transparency in communication about the project and what the process of installation and use will look like. He recalled that when he served on the Mauna Kea Management Board, part of the decommissioning process for the telescopes was to return the land to exactly how it was before the telescope was there. He suggested that the same should be true for the HIFL project: that they should be transparent with the community about the possibilities for decommissioning the cable at the end of its use life, and that there should be funding in place to ensure that the decommissioning process will also come to fruition. He also recommended that the project team work with the Keaukaha community to identify an appropriate cultural practitioner with ties to Keaukaha and knowledge regarding the cultural practices that occur around the project area to serve as a cultural monitor and community liaison during project activities. He emphasized that there are many different types of specialized cultural knowledge in Keaukaha, and that it would be important to identify someone with the relevant cultural experience; for example, someone with family connections to Keaukaha who has spent a great deal of time fishing there. He suggested the Keaukaha Community Association would be able to help guide the project team to find the appropriate person.

Hawaiian Home Lands Beneficiary Consultation Meeting

A Beneficiary Consultation Meeting on the HIFL project facilitated by DHHL was held at the Keaukaha Elementary School in the evening of July 8, 2025. The meeting was attended by roughly 20 individuals, and invitees included existing lessees as well as applicants on the waitlist with Hilo zip codes.

The HIFL team present at the meeting included representatives from ONI, UH, Tetra Tech, and Pacific Legacy. The team presented a high-level overview of the HIFL project and its role as middle-mile infrastructure within the Connect Kakou Initiative. The integral role that fiber connectivity plays in nearly all aspects of our lives, as well as the importance of not just fiber capacity, but also redundancy, was stressed. It was noted that most subsea cable systems providing internet access to Hawai‘i had already, or were soon to, reach the end of their designed age. The technical details of submarine cable construction were presented, including the offshore activities and the HDD method to reach shore. Due to the high quantity of existing underground utilities in the area around PACRC, it was determined that the least intrusive method to come onshore was to drill under the existing infrastructure rather than attempt to trench a path through the existing network of pipes.

Community members shared their frustrations with the current state of internet access in Keaukaha, which included limited connectivity and a high monthly cost. Those who attended the meeting were eager to see better internet access and connectivity as an outcome of this project. It was clarified that the HIFL project would only be addressing the middle-mile infrastructure, and that it would be up to the providers who make use of the new fiber capacity to determine who and how they would service the area. DHHL asserted that the people of Keaukaha were one of their highest priorities for increasing provider options and connectivity. The group discussed the possibility of the homesteads entering the carrier market and becoming their own service provider. Attendees also inquired about the safety of the fiber optic technology; the nature of the public-private partnership and potential benefits specific to OHA, DHHL, and Native Hawaiians; how those in Keaukaha would be able to access and benefit from this infrastructure; and whether the project would be consulting with community members with regard to burial sites and cultural resources in

the vicinity of the project. They also stressed that it should be a priority to recruit first from the community and provide training opportunities so that local people and Native Hawaiians would be qualified for positions on the project, rather than bringing people in from outside, which tends to have negative impacts on the community, including through eliminating job opportunities and further increasing rent prices.

The HIFL team noted that they were currently consulting for the CIA and Ka Paʻakai Analysis, and were planning to continue consultation through the Section 106 process and in conjunction with HRS 6E review. No specific information regarding the presence of traditional customary practices or valued natural and cultural resources was shared during the beneficiary meeting. Community members recommended the project reach out to Papa Lokahi and Alu Like. Both of these organizations were invited to consult on the CIA and Ka Paʻakai Analysis, but did not respond to our outreach effort.

5.0 SUMMARY AND RECOMMENDATIONS

In keeping with the guidelines provided by the Office of Environmental Quality Control (OEQC 1997), the purpose of this CIA and Ka Paʻakai Analysis was to identify and describe cultural resources, practices, and beliefs within the project area and the broader *ahupuaʻa* within which portions of the project area are situated; to determine any impacts the project may have on these resources, practices, and beliefs; and to identify alternative actions or mitigation measures to protect any resources, practices, or beliefs which may be impacted.

The following sections provide an analysis of potential effects to known traditional cultural resources, practices, and beliefs within the proposed HIFL Project Area, as well as the broader *ahupuaʻa*, as well as potential mitigation strategies for managing possible impacts. As each *ahupuaʻa* is a large and storied place, the current report places an emphasis on the areas around the cable landing sites.

5.1 TRADITIONAL CULTURAL RESOURCES, PRACTICES, AND BELIEFS IDENTIFIED AT EACH CABLE LANDING SITE STUDY AREA

5.1.1 Kauaʻi Cable Landing Site

Hanamāʻulu has long been known as a good location for canoe landings. Many of the oral historical accounts and *moʻolelo* recount canoe landings made in the area, which were much easier in the protected bays. *Moʻolelo* and the presence of a major *heiau* suggest the likelihood that Hanamāʻulu was the residence of some *aliʻi.* There is also a known burial area (SIHP 50-30-08-00103) located in close proximity to the northern end of the Nukoliʻi Beach portion of the project area and a habitation complex consisting of two cultural deposit features (SIHP 50-30-08-01838) as well as a reinterment area within the southeastern portion of the Nukoliʻi Beach portion of the project area, closest to the beach, which indicates that people were utilizing the area for habitation and burial purposes beginning in the pre-Contact period. Many oral historical accounts of Niumalu discuss the botanical landscape, including *niu*, or coconut trees, which are associated with the place name, as well as *mokihana*, a tree endemic to Kauaʻi. *Mele* also recount the beauty of the area, in addition to the florals. Alakoko Fishpond is one of the most storied locations in Niumalu Ahupuaʻa, and its construction is often attributed to *menehune*, commissioned by *aliʻi.* Handy (1940:67) observed that despite the small size of Niumalu Ahupuaʻa, it was one of the most important areas for fishing in Kauaʻi.

Archival sources highlight the population center that developed through time on the southeastern shore of Kauaʻi, which is now known as the city of Līhuʻe. The entirety of Hanamāʻulu and Niumalu Ahupuaʻa were awarded to Ke Aliʻi Victoria Kamāmalu as part of a *konohiki* award (LCA 7713, ʻĀpana 2). The *ahupuaʻa* of Niumalu was passed from Kamāmalu, to her father, Kekuanaoa, then to her brother Kamehameha V. Upon his death, it was inherited by her half-sister Ruth Keelikolani, who later sold the land to Paul P. Konoa in 1883 (Ching et al. 1973). Although no LCAs were identified in the vicinity of the Nukoliʻi Beach or Kauaʻi Community College portions of the project area, there are around 20 *kuleana* parcels claimed within Hanamāʻulu Ahupuaʻa (Soltz et al. 2014) and 24 within Niumalu Ahupuaʻa (Kamai et al. 2016). Most of the awards in both *ahupuaʻa* include *loʻi*, *kula* lands, and house lots (Kamai et al. 2016), indicating that Hanamāʻulu and Niumalu were

utilized for a variety of subsistence strategies, including fishing as well as irrigated and dryland agriculture (Handy 1940:67).

Large-scale sugarcane cultivation was the notable post-Contact agricultural endeavor, largely carried out by foreign industrialists. The portion of the HIFL project area at Kauaʻi Community College is situated adjacent to Puhi Camp, which was associated with Grove Farm.

Post-Contact development around the Nukoliʻi Beach portion of the project area included the Nukolii Dairy, as well as a racetrack and airfield. During the latter half of the twentieth century, the Nukoliʻi Beach area became the subject of a long and bitter dispute over the building of a resort and the wider implications of tourism on Kauaʻi. The tensions created a deep divide and led to violence and arrests, which greatly impacted the community (Evslin 2016).

Previous ethnographic research in the Hanamāʻulu Bay area highlighted the importance of gathering *hāʻukeʻuke* (edible sea urchin), *limu, limu kohu, limu wawaeʻiole, pili* grasses, wild spinach, and *ʻopihi*; spearfishing, reef fishing, throw net fishing, and other types of fishing; catching lobster, *heʻe,* and *ʻoʻopu*; crabbing; diving; and *kilo* (or spotting) for *akule* in the bay. Also stressed was the importance of Hanamāʻulu Bay and the surrounding beach areas as a burial area (Rosendahl 2001).

Participants in the consultation process for this project noted that the ocean recreation community often uses Nukoliʻi Beach as a location to launch and land canoes, enjoy the beach, fish, collect shells, conduct marine debris cleanup operations, and SCUBA, skin, and free dive. It was also stressed that access to Nukoliʻi Beach is imperative for safety, as marine rescue operations are launched from the shore when the need arises and emergency landings on Nukoliʻi Beach have been made by paddlers in the past. They also noted the presence of endemic Hawaiian monk seal (*Neomonachus schauinslandi*) and the endemic Hawaiian green sea turtle (*Chelonia mydas*) at Nukoliʻi Beach. Participants emphasized the continued importance of Nukoliʻi as an area where the cultural practice of canoe launching takes place, and also stressed the importance of protecting native wildlife as well as archaeological sites and features in the area.

5.1.2 Oʻahu Cable Landing Site

The project area is in close proximity to a number of significant places in Honouliuli, including Puhilele, the Barbers Point Lighthouse. The *ʻōlelo noʻeau* which make reference to Honouliuli or ʻEwa describe the area's characteristic red earth and abundant marine resources, though these are generally referencing the West Loch/Puʻuloa area further to the east of the project area. Barbers Point Beach Park lies within the uplifted coral reef of the ʻEwa Plain in the area known as Kalaeloa. The limestone pits that characterize this area have been found to contain significant cultural deposits, paleoenvironmental data, as well as burials in some instances.

During the Mahele, Honouliuli Ahupuaʻa was awarded to Miriam Keʻahikuni Kekauʻōnohi. Archival research did not identify LCAs in the vicinity of the project area, and the majority of LCAs in the *ahupuaʻa* are concentrated near Honouliuli Stream in the Puʻuloa/West Loch area. Post-Contact land use was largely focused on commercial ranching and agricultural ventures, including Honouliuli Ranch and the Ewa Plantation Company. The OR&L Railroad began operations in 1889.. The ʻEwa Plain and Puʻuloa became key sites for military development during WWII. A residential and industrial boom following the war led to the development of Makakilo, Kapolei, and Campbell Industrial Park.

Previous consultation efforts for projects in Honouliuli have identified a range of cultural resources, practices, and beliefs in Honouliuli, many of which are concentrated in the area around Puʻuloa. This included rich marine fisheries, salt pans, coastal freshwater sources, and *limu*. Other important features identified included the network of pre-Contact trails crosscutting the *ahupuaʻa*, many of which either intersect with or have been developed into modern roads, including Farrington Highway; natural coral and rock coves used for shelter; limestone pit features, and in particular their potential to contain *iwi kūpuna*; and the spiritual strength of burial areas in Honouliuli.

Participants in the consultation process for this project emphasized that Honouliuli is a living cultural landscape, with descendants and practitioners continuing to perpetuate, revive, and build on long-standing traditional cultural practices. They spoke to the following cultural resources, practices, and beliefs specifically: the potential for *iwi kūpuna* to be present in the project area; the potential presence of access trails or resource gathering sites in or near the project area; valued offshore resources including those identified during the desktop review (the *Arthur* and the *Liliu*) and marine resources including fisheries, *limu*, and coral; the unique geomorphology of the Barbers Point area, and in particular the possible presence of limestone pit features or *kālua*, which carry great cultural significance beyond that which they might contain and should be considered cultural resources in their own right; *kāluamahi* (traditional agricultural practices in limestone pits) and *kāluawai* (traditional water access points in limestone pits); the potential for limestone pit features, many of which have not been investigated, to contain cultural deposits, environmental data, and/or *iwi kūpuna*; the presence of fresh and brackish water sources underneath the limestone cap rock in Kalaeloa; the nearby wildlife refuge and native species that rely on the subterranean water accessed through limestone pits (*kāluawai*) including *ʻōpaeʻula*, *ʻakoko* and the ʻEwa *hinahina*; and other resources and places which are located further away from the project area but still hold significant value, including Ordy Pond and the permanent settlements and expansive irrigated *kalo* floodplains near Puʻuloa.

5.1.3 Maui Cable Landing Site

Wailuku Ahupuaʻa is a large and centrally located region in the isthmus between East and West Maui. It is a part of *Na Wai Ehā*, or the "Four Waters of Maui," along with Waikapu, Waiehu, and Waiheʻe, all of which were later grouped into a single district known as Na Poko. The meaning of the name Wailuku, often translated to "water [of] destruction," has been attributed to a late 18th century battle between Kalaniopuʻu and Kahekili known as "*Ahulau ka Piʻipiʻi i Kakanilua*," or "Slaughter of the Piʻipiʻi at Kakanilua." An alternate explanation attributes the name to the 1790 Battle of ʻĪao, also known as the "Battle of Kepaniwai," or "the damming of the waters."

The project area lies within the Pleistocene aeolian sand dunes that characterize most of the isthmus between East and West Maui. Marine resources were abundant around Kahului Harbor, and a wide variety of fishing techniques were practiced. This included bag net fishing, which was a method well suited to sandy areas like Kahului and Hilo Bay. Sweet potato plantations and fishing settlements lined the north coast of Maui, with *loʻi kalo* concentrated around the plains of the Wailuku River. The sandy dunes of the isthmus are a known burial area, and the Plains of Kamaʻomaʻo are an area where spirits were known to wander.

During the Mahele, Wailuku Ahupuaʻa was designated as Crown Land. A number of LCAs were awarded in Wailuku, though most are located in the flood plains of ʻĪao Valley, far from the project area. A smaller number are clustered closer to the shore, just north of the project area. Many of the

LCAs near the project area were awarded as land deeds by Kamehameha IV. A portion of the project area lies within LCA 420, awarded to H. Kuihelani.

Vivid descriptions of the abundant landscapes of *Na Wai Ehā* with its "fat fish" and "lovely gardens" prior to the introduction of commercial sugarcane agriculture to Wailuku emphasize the radical transformations Wailuku's landscapes underwent during the post-Contact period. A portion of the project area is located within former HC&S lands. The development of large-scale irrigation infrastructure, the Kahului Railroad, Kahului Harbor, and much of the early development of Kahului Town was largely a product of the growing sugarcane industry on Maui during the late nineteenth and twentieth centuries.

Consultation participants highlighted some of the traditional cultural practices that were once practiced in this area, but have since been limited by the extensive development in and around the project area. This included fishing and gathering *limu*, and maintaining the *ʻauwai* system to ensure the water that flowed through them was filtered and directed to the appropriate areas to nourish the landscape. It was observed that people did not eat food that came from the river anymore, because it had become polluted. The neighborhoods had also changed, shifting away from families living communally in neighborhoods to large, gated, private properties. It was noted that the shift in food base from resources that came from the land to one based largely on imported goods had also impacted traditional practices and care for the landscape.

5.1.4 Molokai Cable Landing Site

Kaunakakai, formerly known as Kaunakahakai, which references the use of the harbor as a place for canoe landings and fishing, was and is a central location on the island of Molokai. Due to the freshwater springs located offshore, which prevented coral growth in this area and thus created a natural break in the reefs, it was renowned as a canoe landing site and features prominently in recorded oral traditions and tales of *aliʻi* landing at Kaunakakai during campaigns for control of the Oʻahu, Maui, and Hawaiʻi Island chiefdoms throughout the pre-Contact and early post-Contact period of Hawaiian history. The *moʻolelo* of ʻAiʻai references a unique fishing method practiced at Kaunakakai, consisting of kicking *pua* onto the shore. The rich marine resources of Kaunakakai were also noted for the *aloalo* (squilla, or mantis shrimp). The fresh *wai* descending from the mountains via carved gulches also sustained wetland and dryland agriculture, including *kalo* and *ʻuala*. *Moʻolelo* also noted the extensive fields of *pili* grass in Kaunakakai.

Kaunakakai Ahupuaʻa was not awarded during the initial 1848 Mahele division of the lands. Land records indicate that Kaunakakai was owned by Kalani Pueo in 1843 and subsequently passed to Abner Pākī. In 1855, Kamehameha V purchased the entire *ahupuaʻa* and built a large, secluded estate, Mālama, near Kaunakakai Harbor and fronting the beach. Kaunakakai Ahupuaʻa eventually passed to Bernice Pauahi Bishop and thence to the trustees of her estate.

In 1897, Molokai Ranch purchased the *ahupuaʻa*, and in 1898 incorporated the American Sugar Company, ushering in an era of cattle ranching and large-scale sugarcane and pineapple agriculture. The growth of Kaunakakai Town and Kaunakakai Harbor was largely a product of these industries. In order to facilitate shipping, a wooden wharf and pier were soon constructed, serviced by a narrow-gauge railroad, and later improved with a concrete wharf and dredging of the harbor. In tandem with this commercial infrastructural development, Kaunakakai Town expanded with the influx of agricultural laborers and the need for housing, storage buildings, and shops. In 1935,

Kaunakakai Town was officially established as the seat of Molokai's government, with civic development further expanding the town. Following the end of large-scale agriculture in the mid-twentieth century, Kaunakakai Town remained Molokai's major residential, commercial, and civic center.

Native Hawaiian families have carried out traditional cultural practices and beliefs for generations in Kaunakakai. Archival research and communications with knowledgeable individuals who have generational ties to the area have identified a range of these practices, many of which center on the area surrounding Kaunakakai Harbor and continued access to its shores and marine resources. This includes cultural practices such as fishing, traditional gathering practices, surfing, diving, and swimming, as well as paddling and canoe races. The responsibility to *mālama* the marine ecosystems and resources of Kaunakakai and to respect the deep ties of the Hawaiians to the ocean and Kanaloa were emphasized during consultation for this project.

5.1.5 Lānaʻi Cable Landing Site

Mānele was the location of a permanent pre-Contact village as well as a burial area. The gulch Kaupakuea is named for the thatched ridge poles of the many house sites that once populated Mānele, and the gulch was lined with house sites, terraces, enclosures, and mulch pits where a wide variety of crops were cultivated, including *kalo*, *ʻuala*, *niu*, *milo*, *noni*, *kou*, *hala*, and *wiliwili*. A number of pre-Contact trails ran along the shore and connected the coast to the uplands. As with many of the more recent roads on Lānaʻi, the road leading from Mānele Harbor to the uplands of Pālāwai was adapted from the pre-Contact trail system. The sand dunes extending behind Mānele are known to contain burials. They have also been home to nesting seabirds such *ʻuaʻu kani*. Though there was limited freshwater on the coast, elder *kūpuna* knew how to dive into the nearshore waters to find freshwater sources that seeped from cracks in the rocks.

The *moʻolelo* connected to Puʻupehe, an islet off the shore of Pālāwai, describes a number of cultural practices associated with the area. This includes: fishing for *kala* and *aku* in the clear waters of Kalulu; the cave of Malauea; the "great ravine" of Pālāwai and eating *ʻuwaʻu* bird baked in *kī* leaf with sweet *pala* fern root and *ʻōhelo* berries; the cool waters of Maunalei; catching *ʻiʻiwi* and scarlet *ʻapapane* birds in the Pulou ravine; the banana groves of Waiakeakua; baking *honu* in Malauea; and the burial ground of Mānele. When Puupehe died, she was wrapped in bright *kapa* and adorned in *naʻu*. Another *moʻolelo* connected to Puʻupehe and related by Fornander referenced the shark Puaiki, who traveled between Papawai on Maui and Mānele.

Pālāwai Ahupuaʻa was awarded to Chiefess Kekauʻōnohi during the Māhele, and passed to her husband, Levi Haʻalelea, upon her death in 1851. A portion of LCA 10041, awarded to Kanekileia in the group claim under Lono et al. (Helu 10024 through 10058), lies within the project area. This parcel was known to contain a house site and sweet potato patch. Walter Murray Gibson purchased the *ahupuaʻa* of Pālāwai from Levi Haʻalelea in 1863. He and subsequent owners of these lands continued to consolidate private land ownership on Lānaʻi until the majority of the island was under a single fee-simple owner by the early 1900s.

In the post-Contact period, the project area was initially used for sheep and later transitioned into cattle ranching. The surrounding area was also used by the Hawaiian Pineapple Company until the final harvest in 1992. The project area also lies within Mānele Harbor. *Lele kawa* (cliff diving) was a favored activity in Mānele, especially from the cliffs on the southwest side of the coastline at

Leinohaunui. In the 1920s, Baldwin Ranch built a cattle chute near the Leinohaunui bluffs. Under the Hawaiian Pineapple Company, Mānele Landing was a popular hangout for plantation families. In the 1930s, mortar salt beds were added to the landing at Mānele, though they were moved to the cliffs above the landing in 1943. The harbor was subsequently developed into the Mānele Small Boat Harbor during the 1960s and 1970s.

Previous ethnographic research related to Mānele and Pālāwai Ahupuaʻa emphasized fishing for *akule* and *ʻōpelu*, which were abundant at Mānele, and the presence of sharks in the bay. Some considered the sharks part of their family and would not harm them. Families would travel across the island on established trails for seasonal fishing. One *kupuna* referred to the ocean as a "Hawaiian ice box," and noted that fishing at different spots throughout the year was a resource management practice that limited the chance for overfishing and long-term impacts to marine resources. Others recalled the 1951 pineapple strike that lasted seven months. During this time, the employees that were on strike completed many collective labor projects, including the development of the Mānele wading pool (also known as "Keiki Pond"), which was constructed through dynamite blasting followed by pick and shovel work.

Participants in the consultation for the current project emphasized the great cultural and historical significance of the area surrounding Mānele, as evidenced by numerous archaeological sites and burials in the vicinity of the project area.

5.1.6 Hawaiʻi Island Cable Landing Site

The Hawaiʻi Island portion of the HIFL subsea cable will come onshore at Puhi Bay, in an area traditionally known as Milo or Puuhomilo. Portions of this area are included within DHHL lands and the entire region is connected with, and stewarded by, the Keaukaha homesteaders. As such, it is an area with strong ties to past and ongoing Native Hawaiian cultural practices, valued resources, and beliefs.

The Hilo area in general is known for its frequent rains that provide ample freshwater and lush vegetation. This is reflected in the *ʻolelo noʻeau* that reference the region, as well as boundary commission testimonies that make frequent reference to streams, grottos, waterholes, house sites, and cultivation plots. A variety of plants were grown, including *kalo* (taro; *Colocasia esculenta*), yams (*Dioscorea* sp.), bananas (*Musa* sp.), *kī* (ti; *Cordyline fruticosa*), *mamake* (*Pipturus albidus*), and coconuts (*Cocos nucifera*). In areas where *kalo* could not be planted in *loʻi*, the *kipi* method of *kalo* planting was used, or *kalo huli* were submerged in water and held upright by lava rock mounds. Hilo was also a major area for *ʻulu* planting, which is further reflected by the *moʻolelo* of Ulu and Mokuola. A wide variety of fishing methods and gathering practices were employed in Hilo Bay. At least four different types of *limu* were available in the bay: *limu ʻeleʻele*, *limu huluhuluwaena*, *limu kohu*, and *limu ʻakiʻaki*. Fishponds cultivated *ʻamaʻama*, *awa*, *ahole*, and *ʻoʻopu*, and supported avifaunal species including *koloa-maoli*, *ʻalae*, *kukuluāeʻo*, and migratory pintail, widgeon, and shoveler ducks. During the Kamehameha Dynasty, some of the fishponds in Waiākea were known as the "Royal Ponds," and supplied mullet reserved for the King.

Historic properties identified in the vicinity of the HIFL project area are all post-Contact features, the majority of which are related to past sugarcane cultivation by the Waiakea Mill Company, the operations of the Hilo Dairy, or structures of significance to the Keaukaha community. In the area around PACRC, previously identified historic properties are post-Contact architectural features and

include the Hilo Breakwater, Hilo Harbor, Hilo Railroad Company tracks, Peter Arioli House, Kahauolupua House, St. Mary's Gate of Heaven Church, Kuhio Memorial Chapel, and Kamehameha Hall.

There are a number of LCA awards in the coastal region of Waiākea Ahupuaʻa, though none are located near the project area. The UH Hilo campus portion of the project area is in an area that was formerly under sugarcane cultivation for the Waiākea Mill Company. The PACRC portion of the project area is in an area that was set aside for the Keaukaha Beach Park by Executive Order 421, during the passage of the Hawaiian Homes Commission Act in 1920. In 1924, the Keaukaha-Panaewa Hawaiian Home Lands followed the Hoʻolehua and Palaʻau Homesteads on Molokai to become one of the first Hawaiian Homesteads established. Akoi (1989) recorded firsthand knowledge of life in Keaukaha prior to and following the formal establishment of the Homesteads. Keaukaha was a thriving community, and people sustained themselves with a variety of agricultural and fishing techniques.

Several *moʻolelo* are connected with Milo, including the *kupua heʻe* that lived at the *puʻu* that used to be in Milo and would sometimes take one of the children who went to Puhi Bay to swim, and the shark *ʻaumakua* (Kaholeakāne) protecting the waters and people of Keaukaha. The legend of Laukaieie references subterranean waterways which extend inland from Milo to Kahiolo in the Panaʻewa forest, near the *mauka* edge of Honohononui and intersecting with the old Puna trail. The spring that emerged on the Milo side was an area where people would go to collect freshwater. A much-storied shark hole lies offshore at Puhi, sometimes referred to as Ka Lua Manō O Kaholeakāne. Akoi (1989) documented the practice of *kahu hanai*, feeding and caring for the shark, which began as early as the 1700s and continued at least into the 1930s. A small island at Puhi overgrown with *hau* contains the remnants of a stone structure interpreted by archaeologist Alfred Hudson as a burial vault, and re-identified as a *heiau* with probable associations to Kaholeakāne by cultural practitioners.

This area has been used for subsistence activities including fishing and gathering of ocean resources, swimming, *hoʻomoana*, large-scale organized camping activities, and other traditional cultural practices associated with nearshore areas. The splash zone at Puhi Bay was located as close as 10 feet from the shore, and provided an important habitat for littoral resources like *hāʻukeʻuke*, *wana*, *ʻopihi*, *kupeʻe*, and *pipipi*. The fresh and brackish water ponds of Keaukaha likewise were home to valuable resource, like the "Hawaiian popcorn" *ʻōhua* fish. They also served as swimming holes and natural 'refrigerators' to temporarily store resources gathered from the ocean.

Consultation participants emphasized that although the area had undergone significant development over the decades that had transformed the landscape, many traditional cultural practices continue today. Even the development of the raw sewage plant did not stop the community from cleaning up the area to make it suitable for fishing and swimming. Portions of Puhi Bay still contain *limu ʻeleʻele,* and canoe clubs like the Keaukaha Canoe Club also use this area for their activities. The beach in front of PACRC where the HIFL cable will come onshore came to be known colloquially as Piggy's Point, named after Uncle Piggy Kaleohano, who camped there every summer with his family. Puhi Bay is also a place where people scatter the ashes of their loved ones. Many of the local schools also use Puhi Bay as an outdoor classroom extension for teaching and student activities.

5.2 Potential Impacts to Resources and Traditional and Customary Native Hawaiian Rights Identified at Each Cable Landing Site Study Area

5.2.1 Kauaʻi Cable Landing Site

A key concern for CIA participants was the ability to access Nukoliʻi Beach, both during and after construction. Participants stressed the importance of retaining easy access to Nukoliʻi Beach, both from the shore and from the water, as well as the offshore waters. The ocean recreation community often uses Nukoliʻi Beach as a location to launch and land canoes, enjoy the beach, fish, collect shells, conduct marine debris cleanup operations, and SCUBA, skin, and free dive. It was also stressed that access to Nukoliʻi Beach is imperative for safety, as marine rescue operations are launched from the shore when the need arises and emergency landings on Nukoliʻi Beach have been made by paddlers in the past. It is essential that easy access to Nukoliʻi Beach is maintained in order to continue to carry out cultural practices and subsistence strategies that have been maintained for generations, such as canoe racing and fishing.

Participants also stressed their concern about marine wildlife, including, but not limited to the endemic Hawaiian monk seal and the endemic Hawaiian green sea turtle, both of which utilize the shoreline at Nukoliʻi Beach. Both species are threatened under the Endangered Species Act and protected by Hawaiʻi State law.

CIA participants also stated that archaeological resources from both the pre- and post-Contact periods should be preserved and protected.

No feedback specific to the portion of the project area at Kauaʻi Community College was received.

5.2.2 Oʻahu Cable Landing Site

The potential for the project to encounter *iwi kūpuna* was a primary concern for consultation participants, who stressed the importance of treating burials and other culturally significant resources with care and respect. One participant stated the *kālua* themselves should be considered a resource, while another participant stated these pits "are ancestral features tied to our identity as kānaka." Participants observed that nearshore resources, especially coral and *limu*, have been impacted by previous projects whose activities included water diversion, pollution, and/or runoff, and that any impacts on these baseline resources would likely carry up into broader negative consequences for entire marine ecosystems. They noted that offshore resources, including the traditional fishery in the area, also warranted careful documentation and preservation and should be protected from potential impacts from the project. They identified the presence of fresh and brackish water underlying the limestone cap rock of the ʻEwa Plain and observed that this water source had also been impacted by previous projects (e.g., when the cap rock was cracked during harbor expansion), and that the project should take care to avoid further detrimental impacts to this source or the ecosystems that depend on it.

5.2.3 Maui Cable Landing Site

Concerns identified by consultation participants included whether the project will, or has the potential to, introduce new contaminants into the nearshore ecosystems; what may happen in a 'worst-case-scenario' and whether the project will be equipped to handle an emergency, should one occur, to ensure the area is not exposed to further contamination; how the project and its related activities will impact the fishermen, canoe clubs, and other people who use this area for fishing, canoe racing, and other traditional cultural practices; and how the project will maintain transparency and communicate information to the community throughout its duration, and particularly in the event of an emergency.

5.2.4 Molokai Cable Landing Site

Key concerns that were raised in the Molokai portion of the project area were potential disruption to the marine environment and impacts to marine ecosystems, including the near-shore and benthic environments, via the laying of cables atop these ecosystems and the potential effects of electromagnetic fields generated by the cables on marine life, including their navigation and communication abilities. These impacts were perceived in turn to affect Native Hawaiian rights to "access, protect, and sustain the marine resources that have nurtured us for generations" (Heen 2025; see Appendix C). This includes potential impacts to fisheries, traditional gathering practices, and the desecration of Kanaloa through intrusive activities in the marine environment.

5.2.5 Lānaʻi Cable Landing Site

Archival research and consultation identified Mānele as a permanent pre-Contact settlement, as well as a burial area. Consultation participants were primarily concerned about the known presence of *iwi kūpuna* in this area and that the project may encounter *iwi kūpuna*. Previous projects, including construction activities for the Mānele Small Boat Harbor, have disturbed *iwi kūpuna*.

5.2.6 Hawaiʻi Island Cable Landing Site

Community members and interview participants identified potential impacts to contemporary fishing practices, disruptions of *hoʻomoana* camping activities in the area, possible impacts to *limu* or *limu* collecting practices at Puhi Bay, impacts to freshwater and brackish ponds on Keaukaha's coastline, interruptions of canoe club activities, disruption of memorial practices like scattering of ashes, and impacts to educational activities.

There was significant concern over the potential impacts of the cable and its installation on marine ecosystems, including the *laupapa* and the freshwater and brackish ponds along the coasts of Keaukaha. Participants were concerned about drilling and trenching in the ocean, and that this could cause disruptions to already fragile nearshore and reef ecosystems that may take many years to recover. They expressed a desire for the project to consider alternatives to drilling for laying the cable, and to select the least impactful method possible for its installation. They also had concerns about the safety of the cable, and what potential hazards there would be if the cable was damaged or otherwise impacted, as well as what would happen when the cable reached the end of its use life,

how it would be commissioned, and how the project would make sure there was funding in place to appropriately decommission the cable.

Concern was also raised regarding potential impacts from fronthaul trenching, including areas that may not be directly subjected to ground disturbance but are nevertheless affected by project activities, for instance from holding rubbish mounds or construction equipment staging. It was also noted that the PACRC facility used to be home to a sewage treatment plant, and that the County of Hawai‘i was in the process of making improvements to sewage pipes in the area. Participants wanted to make sure the project was aware of these activities and hoped that the HIFL project would not have impacts on planned improvements to sewage treatment infrastructure.

There was less concern expressed regarding potential impacts to the UH Hilo campus portion of the project area, as it lies fully within an established university campus, and this area had already undergone a significant amount of development and disturbance. However, it was noted that the *ahupua‘a* of Waiākea is Crown Lands, and that a portion of lease revenue from private projects on Crown Lands should be going back to the State to benefit Native Hawaiians.

Keaukaha community members shared their frustrations with the current state of internet access in Keaukaha, including limited connectivity and high monthly costs. They were also concerned about the project bringing in labor from outside of Hawai‘i, and noted that not only does this take away potential job opportunities for local and Native Hawaiian people, but it can also have other consequences for the community, including driving up rent prices.

5.3 Potential Feasible Actions to be Taken to Reasonably Protect Native Hawaiian Rights at Each Cable Landing Site Study Area Identified by CIA Participants

5.3.1 Kaua‘i Cable Landing Site

Access to Nukoli‘i Beach, concerns about potential impacts to wildlife, and concerns about potential impacts to archaeological resources were the primary concerns of CIA participants. Given that the project will require a portion of the beach park to be closed during construction, specific actions which could be taken to mitigate potential effects of the project on public access and potential impacts to wildlife include: ensuring that project activities, including construction, do not restrict public access to Nukoli‘i Beach and nearshore areas; working collaboratively with local canoe clubs to avoid any potential impacts to canoe club activities during project construction or as an outcome of installation; maintaining sufficient distance from marine wildlife during project construction by shifting activities to another area if wildlife such as monk seals and sea turtles are present. Given that the project has the potential to impact archaeological resources, compliance with all requirements of SHPD regarding archaeological resources is recommended to ensure that they are not adversely impacted.

5.3.2 O‘ahu Cable Landing Site

Consultation participants emphasized the necessity of treating *iwi kūpuna* and other culturally significant materials with care, not only with regard to the law, but also in accordance with Native Hawaiian traditions. The importance of *kālua* (limestone pits) was discussed by participants as

their significance to both *iwi kupuna* and natural resources could not be stressed enough. Given that most of the area of Barbers Point Beach Park is underlain by limestone karst, it is possible that the project could adversely impact burials or cultural deposits within *kalua* that are not currently visible on the surface. To this end, recommendations included completing an archaeological inventory survey to fully identify and document all potential historic properties, requesting that a cultural monitor be present during all ground disturbing activities, and requesting that the project follow state and federal guidelines for handling inadvertent burial discoveries and have protocol in place to ensure any *iwi kūpuna* encountered during the project be protected and treated with respect.

The importance of offshore resources, including cultural resources like the *Arthur* and the *Liliu*, as well as biocultural resources like *limu*, coral, and marine ecosystems, was also emphasized. Although no impacts to these resources are anticipated, consultation participants invited the project to support ecosystem restoration efforts like planting *limu*, coral, and native plants if these resources are impacted. Recommendations to protect these resources also included additional surveys to identify potential pre-Contact cultural properties in the project area, and employing mitigation strategies to ensure the project avoids impacts on marine ecosystems. This includes avoiding the introduction of pollutants to the nearshore environment and preventing runoff from construction activities from entering the water system. In addition, participants highlighted the presence of subterranean fresh and brackish water underlying the limestone cap rock at Barbers Point, and recommended that a hydrological survey be conducted in order to identify and avoid impacts to subsurface water that may be underlying the coastal portion of the project area and the results be released to the community.

Consultation participants also stressed the importance of ongoing consultation and collaboration with community members, cultural practitioners, and descendants of Honouliuli, and recommended the project team ensures public access to findings and facilitates open dialogue with community members. These recommendations were made to ensure that the full range of traditional gathering rights, access trails, offshore resources, and other traditional and customary Native Hawaiian resources and rights which may be impacted by the project could be identified, and to build trust and respect across all parties invested in the project and its potential impacts. Community members requested that the project make research data available for community use to the extent possible, for example sharing offshore survey data to facilitate community restoration efforts. They also observed that particular neighborhoods and communities were more frequently subject to the impacts of large-scale infrastructure developments, and recommended the project consider providing a discount to fiber end users that are part of the neighboring communities. This would include UHWO, as home to the project's cable landing station.

5.3.3 Maui Cable Landing Site

On Maui, access to Kahului Harbor and concerns about potential adverse impacts to water quality due to possible contamination from runoff were the primary concerns of CIA participants. Given that the project will require a portion of the breakwater to be closed during construction, specific actions which could be taken to mitigate potential effects of the project on public access and potential impacts to nearshore ecosystems include clear communication and transparently about project plans and potential impacts throughout the duration of project activities. This includes sharing information on any potential introductions of contaminants to nearshore ecosystems and project plans for 'worst-case' scenarios and how the team will respond to ensure that nearshore

ecosystems are not impacted or exposed to further contamination. Participants further recommended that the HIFL team work with local fishermen and canoe clubs in the area to avoid or mitigate any potential impacts to fishing or canoe club activities during project construction or as an outcome of installation.

5.3.4 Molokai Cable Landing Site

Given the importance of marine activities and resources to the Kaunakakai community, it is possible that the project will adversely impact access for marine activities such as fishing, swimming, and canoe racing. To avoid this potential impact, consultation participants recommended that the HIFL team establish a project point of contact to communicate effectively and transparently with the Kaunakakai canoe clubs and wider Kaunakakai community regarding construction schedules and related activities, and concomitantly to facilitate reception of any concerns or questions from the community during the construction phase of the project.

5.3.5 Lānaʻi Cable Landing Site

Consultation participants were primarily concerned about the known presence of *iwi kūpuna* in this area, and the possibility that the project may adversely impact *iwi kupuna.* Given this potential impact, consultation participants recommended that a *kamaʻāina* representative with generational ties to Lānaʻi be on site as a cultural monitor during construction activities. It is recommended that the project work with the community members consulted for this report to identify an appropriate representative for cultural monitoring for the project.

5.3.6 Hawaiʻi Island Cable Landing Site

Participants observed that project-based approaches are not structured for forming community relationships, and that this can often result in community voices being ignored or left out of project decisions that would benefit from community input, including the ways projects identify and mitigate potential impacts. The need for clear communication and to ensure community members have a clear and transparent understanding of the project undertaking and its potential impacts at all phases of the project was stressed by all participants. This included transparency about the possibilities for what will happen to the cable at the end of its use life, how it would be decommissioned, and how funds would be made available for that decommissioning. Likewise, an overall hope was expressed that the project be designed to cause the least amount of impact to people and to ocean ecosystems.

Given that the project has the potential to adversely impact nearshore marine ecosystems and species such as coral, participants expressed a desire to see mitigation efforts in the form of restoration work to offset any potential impacts to coral and other nearshore habitats. They suggested this could be done via a partnership with UH to support ongoing research or other ocean restoration initiatives.

Additional recommended mitigation efforts included incorporating interpretive signage into the project and sharing research outcomes from the project with the community and for the benefit of the greater public.

It was emphasized that the Keaukaha community, and in particular the Hawaiian Homesteads, were the best people to determine the scope of potential impacts and desired mitigation efforts, and that the HIFL team should be consulting with them regularly throughout the duration of the project. Keaukaha community members were eager to see better internet access and connectivity as an outcome of the HIFL project, and also wanted to make sure that the project was beneficial to Native Hawaiian community members specifically. They expressed a desire for the project to consult with community members regarding burial sites and cultural resources in the vicinity of the project. They also wanted the project to prioritize hiring local and Native Hawaiian people, and to consider training opportunities for local people so that they could qualify for skilled positions, rather than bringing people in from outside of Hawai‘i.

It is also recommended that the project team work with the Keaukaha Community Association to identify a cultural practitioner with ties to Keaukaha who could serve as a cultural monitor and liaison to the community during the project.

6.0 KA PA‘AKAI ANALYSIS

The Ka Pa‘akai Analysis framework specifies the analysis identify: (1) the identity and scope of valued cultural, historical, or natural resources, including the extent to which traditional and customary native Hawaiian rights are exercised in the [petition] area; (2) the extent to which those resources (including traditional and customary native Hawaiian rights) would be affected by the proposed action, and (3) feasible actions, if any, to reasonably protect native Hawaiian rights if they are found to exist. The following is a summary of the Ka Pa‘akai Analysis for the HIFL Project.

6.1 TRADITIONAL CULTURAL RESOURCES, PRACTICES, AND BELIEFS

The cable landing sites are situated in coastal locations on each of the six main Hawaiian Islands. These sites and their immediate surrounds are known as areas used for traditional habitation, burial, subsistence, and other cultural activities. In many of these locations, trails connected the coastline with the uplands and surrounding areas. Oral accounts of the botanical landscapes include *niu* (coconut trees), *mokihana*, fields of *pili* grass, *‘ōhelo* berries, *pala* fern, and *kī*. Cultivation of *‘uala*, noni, *kou*, *hala*, *wiliwili*, yams, and *lo‘i kalo* occurred throughout portions of the project area. Animals noted in the area included *‘uwa‘u*, *‘i‘iwi*, and *‘apapane*. The Kaua‘i, O‘ahu, Maui, and Lāna‘i cable landing sites are in areas that are known to contain burials nearby, particularly in sandy dunes or *kālua*. Some of these areas were also home to nesting seabirds, such as *‘ua‘u kani*.

Mo‘olelo describe areas within or near several of the cable landing sites as good canoe landing places. Various forms of fishing and marine resource gathering were identified as a significant part of traditional use of the coastal landscape. Traditional accounts mention the following fishes and aquatic resources: *aloalo*, *kala*, *aku*, *honu*, *limu ‘ele‘ele*, *limu huluhuluwaena*, *limu kohu*, and *limu ‘aki‘aki*. Sharks were also discussed in various areas, particularly as *‘aumakua* that protected the people and waters. Some also practiced *kahu hanai*, feeding and caring for the sharks. Fishponds near portions of the project area, such as Kaunakakai, Molokai, emphasize the practice of fishing for subsistence. Fishponds were used to cultivate *‘ama‘ama*, *awa*, *ahole*, and *‘o‘opu* and supported avifaunal species such as *koloa-maoli*, *‘alae*, *kukuluāe‘o*, and migratory pintail, widgeon, and shoveler ducks. In locations with limited freshwater on land such as Mānele, Lāna‘i, elder *kūpuna* knew how to dive into the nearshore waters to find freshwater sources that seeped from cracks in the rocks.

Post-Contact land use across the project area included large-scale sugarcane and pineapple cultivation, sheep and cattle ranching and dairy farming, and military use. Industrial and recreational development, such as the development of a racetrack, the installation and use of an airfield, and resort development near Nukoli‘i Beach, Kaua‘i, the building of a wastewater treatment facility in Keaukaha, Hawai‘i Island, and the development of harbors and dredging for landings at Kahului, Maui; Hilo; Mānele, Lāna‘i; and Kaunakakai, Molokai had deleterious impacts on traditional cultural practices in many areas. Nonetheless, cultural practices such as gathering of marine resources, fishing, and canoe racing have endured.

Previous ethnographic research highlights the importance of gathering resources such as *hā‘uke‘uke* (edible sea urchin), *kupe‘e*, *pipipi limu*, *limu kohu*, *limu wawae‘iole*, *pili* grasses, wild spinach, *‘ōhua* and *‘opihi*; spearfishing, reef fishing, throw net fishing, and other types of fishing; catching lobster, *he‘e*, and *‘o‘opu*; crabbing; diving; *lele kawa* (cliff diving) and *kilo* (or spotting) for *akule* and catching *‘ōpelu*. Previous studies also identified coastal salt pans, freshwater resources,

and limestone pit features. Fresh and brackish ponds near shore also served as fishing holes or natural refrigerators to temporarily store resources gathered from the ocean. Participants in previous CIAs described seasonal fishing and fishing at different spots throughout the year as a resource management practice that limited the chance for overfishing and long-term impacts to marine resources. Participants in those studies also stressed the importance of various coastlines as burial areas.

Participants in the consultation process for this project emphasized the continued importance of launching canoes and utilizing coastal areas for recreation, including surfing, diving, swimming, paddling, canoe races, camping, and fishing. Participants stressed the importance and responsibility to *mālama* the marine ecosystems and resources of the area, including protecting native wildlife, environmental health, and archaeological sites and features in the area both on and offshore. This includes fisheries, *limu*, and coral as well as unique geomorphological features in the area. Specific species identified for protection include *ʻōpaeʻula*, *ʻakoko*, and *ʻEwa hinahina*. Participants also mentioned protecting freshwater resources both above ground and below, located in limestone pits or subterranean water.

Participants emphasized the importance of living cultural landscapes, with descendants and practitioners continuing to perpetuate, revive, and build on long-standing traditional cultural practices. Participants noted the extensive development in and around various portions of the project area have limited their ability to practice traditional cultural practices including fishing, gathering *limu*, and maintaining *ʻauwai* systems. The shift away from seeking food from land-based resources to relying on imported goods has also impacted traditional practices and care for the landscape. However, despite all these changes, participants stated their communities still show up to maintain coastal areas to make them suitable for their continuing cultural practices, such as fishing and swimming. Participants highlighted the potential for *iwi kūpuna* in the project area, and the need to treat them with respect.

6.2 POTENTIAL IMPACTS TO TRADITIONAL CULTURAL RESOURCES, PRACTICES, AND BELIEFS

Based on the background research and input received through consultation for the CIA and Ka Paʻakai Analysis, potential impacts to cultural resources and practices could result from project construction and installation. The installation of the cable could potentially impact subsurface cultural resources, including burials, that may be present in the project area. Based on the resources and traditional practices identified by participants in portions of the project area, the project has the potential to impact the marine environment, including coral ecosystems, wildlife, freshwater and brackish ponds, and benthic habitats. Subsistence-based activities and recreational activities in the nearshore environment have potential to be impacted as well.

Given the coastal location of each cable landing site, potential impacts include the ability of communities and practitioners to access the shoreline and beach during and after construction, from the shore, the water, and the offshore waters. This includes the launching and landing of canoes, recreational activities, fishing, harvesting nearshore resources such as shellfish and *limu*, and marine rescue operations.

Construction-related activities and the cable itself could have impacts on the surrounding environment. Drilling and cable laying could impact marine ecosystems, which is the realm of Kanaloa and an important part of the cultural landscape. Participants expressed a desire for the

project to consider and select the least impactful method for cable installation. Participants observed that nearshore resources, especially coral and *limu*, have been impacted by previous projects whose activities included water diversion, pollution, and/or runoff, and that any impacts on these baseline resources would likely carry up into broader negative consequences for entire marine ecosystems. Marine wildlife, including but not limited to the endemic Hawaiian monk seal and Hawaiian green sea turtle, as well as offshore resources including the traditional fisheries, also warrant careful consideration and protection from project-related impacts. Other construction-related impacts could occur as a result equipment staging, trenching and excavation, and other onshore activities. For example, participants identified the presence of water resources underground and stressed that the project should take care to avoid detrimental impacts to this resource and the ecosystems that depend on it. Emergencies during construction could release contaminants, which could also affect the surrounding environment and those who utilize these resources. Participants advocated for maintaining transparency and communicating information to the community throughout the duration of the project, and particularly in the event of an emergency.

An additional potential impact is the possibility of encountering subsurface cultural resources, including burials, during project construction. Participants stressed the importance of thorough archaeological investigations as well as treating burials and other culturally significant resources with care and respect. Participants noted that burials have been previously disturbed in the vicinity of some of the coastal portions of the project area and expressed concern over any further disturbances. Participants requested that archaeological resources from both the pre- and post-Contact periods be preserved and protected.

While there are concerns that the project could impact access and cultural resources, it could also provide benefits to local communities that struggle with limited broadband connectivity and high monthly costs. While expressing support for improved access, concerns were raised about bringing in labor from outside of Hawai‘i, as this takes away potential job opportunities and can drive up rent prices for the local community. Participants noted that the project should seek to provide benefits for Native Hawaiians, especially if the project involves leasing of Crown Lands. Participants also suggested that the project team maintain open and transparent communication with the communities within which the project will be situated.

6.3 MEASURES TO REASONABLY PROTECT TRADITIONAL CULTURAL RESOURCES, PRACTICES, AND BELIEFS

Feasible actions that have been identified to reasonably protect traditional cultural resources, practices, and beliefs, and would be implemented as part of the project, are listed below. While certain measures may be responsive to community concerns at individual cable landing site(s), these measures are applicable to the project as a whole and should be implemented across all six cable landing sites.

- Ensure access to the beach, shoreline, and nearshore waters is maintained and not hindered at any time during construction. Work collaboratively with local users, such as fishermen and canoe clubs, to schedule and conduct project-related work in a manner that avoids or minimizes disruption of their activities.

- Designate a point of contact responsible for ongoing communication and consultation with the community specific to each cable landing site regarding proposed project activities, potential impacts, and construction schedule. Ensure communication is effective and transparent, continues throughout construction, and clearly addresses questions and concerns raised by community members.
- Take appropriate precautions to protect marine wildlife and avoid impacts to the marine ecosystem, including measures to address run-off and prevent the introduction of pollutants into the nearshore environment.
- Support ecosystem restoration for sensitive resources, such as *limu*, coral, and native plants, if needed to offset potential impacts.
- Comply with all SHPD requirements regarding archaeological resources to ensure impacts are adequately avoided and/or mitigated.
- Develop a project-specific archaeological monitoring plan, in consultation with SHPD, including site-specific protocols to be followed in the event of an inadvertent discovery of *iwi kūpuna* or other culturally significant materials. The plan should define areas of highest potential cultural sensitivity that may warrant the implementation of cultural monitoring during construction, as well as establish communications protocols, immediate protective treatment measures, and cultural protocols in the event of an inadvertent discovery. If discovered during construction, *iwi kūpuna* and other culturally significant materials should be treated with care in accordance with the law and Native Hawaiian traditions.
- Share project-related studies and findings with the community and broader public to support ongoing community restoration efforts and other educational initiatives.

7.0 CONCLUSION

7.1.1 Kauaʻi Cable Landing Site Study Area

Through background and archival research and community consultation efforts, this CIA and Ka Paʻakai Analysis has identified a range of Native Hawaiian cultural practices and culturally-significant resources in Hanamāʻulu and Niumalu Ahupuaʻa. These include Hanamāʻulu Bay and Nukoliʻi Beach, productive agricultural lands which were planted with range of traditional cultivars, plentiful marine resources at the shoreline and in nearshore waters, and storied locations. In particular, Hanamāʻulu was a likely residence of *aliʻi,* and both Hanamāʻulu and Niumalu supported villages and population centers with intensive agricultural and fishing resources. The project area includes Nukoliʻi Beach, which contains a Hawaiian burial area and subsurface cultural layers, and the Kauaʻi Community College campus, which is located on former Grove Farm sugarcane land.

Community consultation efforts highlighted a number of potential impacts to these important resources and practices. Potential impacts include restricted access to Nukoliʻi Beach and the nearshore and offshore waters, threats to marine species and resources, and potential damage to archaeological resources.

CIA participants asked that the project: (1) not interfere with the ability to launch canoes and marine rescue operations from the shore or to be able to land canoes or swim ashore (especially in emergencies), and work collaboratively with local canoe clubs to avoid any potential impacts to canoe club activities during project construction or as an outcome of installation; (2) take precautions to protect marine wildlife that use the shore, such as the endemic and threatened Hawaiian monk seal and Hawaiian green sea turtle; and (3) be mindful of the preservation and protection of archaeological resources in the Nukoliʻi Beach area during construction, including compliance with all requirements of SHPD regarding archaeological resources to ensure that they are not adversely impacted by project activities.

7.1.2 Oʻahu Cable Landing Site Study Area

Background and archival research combined with community consultation identified a number of Native Hawaiian cultural practices and culturally-significant resources in Honouliuli Ahupuaʻa. This included the *kālua*, or limestone pits, that characterize the ʻEwa Plain and should be considered cultural resources in their own right; *kāluamahi* (traditional agricultural practices in limestone pits) and *kāluawai* (traditional water access points in limestone pits); the possibility that *kālua* may contain cultural and paleoenvironmental deposits, groundwater, and/or burials; the potential for *iwi kūpuna* to be present within the project area; abundant marine resources, with a particular focus on potential impacts to corals, *limu*, and nearshore fisheries; water sources underlying the limestone cap rock at Kalaeloa; offshore resources including submerged resources identified during desktop review (e.g., the *Arthur* and *Liliu*); and access trails or gathering sites located in or around the project area. Participants emphasized the importance of understanding Honouliuli as a living cultural landscape, with descendants and practitioners continuing to perpetuate, revive, and build on long-standing traditional cultural practices.

Potential impacts to these resources that were of particular concern to consultation participants included the potential for the project to encounter *iwi kūpuna*; impacts to nearshore resources,

which had been previously observed from activities including water diversion, pollution, and runoff; potential impacts to groundwater underlying the limestone cap rock; and potential for project activities to impact submerged resources.

Recommended feasible actions that could be taken to reasonably protect these resources and mitigate potential project impacts include: (1) cultural monitoring during all ground disturbing activities; ensuring legal and respectful protocols are in place in the event that *iwi kūpuna* are encountered during project activities; (2) additional survey to identify pre-Contact historic properties in the project area; (3) employing mitigation strategies to ensure the project avoids impacts on marine ecosystems; (4) contributing to ecosystem restoration efforts in Honouliuli if resources are adversely impacted; (5) conducting a hydrological study to identify and avoid impacts to water sources underlying the limestone cap rock; (6) maintaining ongoing consultation and collaboration with community members throughout the project; and (7) considering other potential benefits to the neighborhoods hosting the subsea cable telecommunications infrastructure, such as discounted service rates.

7.1.3 Maui Cable Landing Site Study Area

Background and archival research and community consultation identified a range of Native Hawaiian cultural practices and culturally-significant resources in Wailuku Ahupuaʻa.

Community consultation identified potential impacts or concerns about the project, including concerns about the cleanliness of the environment, and whether the project will, or has the potential to, introduce new contaminants into the nearshore ecosystems. Concerns about what may happen in a 'worst-case-scenario,' and how the project will be equipped to handle such emergencies and ensure that the area is not exposed to further contamination were expressed. Another concern was how the project and its related activities will impact the fishermen, canoe clubs, and other people who use this area for fishing, canoe racing, and other traditional cultural practices, as well as how the project will maintain transparency and communicate information to the community throughout its duration, and particularly in the event of an emergency.

Feasible actions that may be taken to mitigate impacts include: (1) maintaining clear and transparent communication with the community regarding project plans and potential impacts; (2) sharing plans for how the team will respond to 'worst-case' scenarios during project activities to ensure nearshore ecosystems are not impacted or exposed to further contamination; and (3) working closely with local fishermen and canoe clubs who utilize the area to ensure fishing and canoe club activities are not impacted by the project.

7.1.4 Molokai Cable Landing Site Study Area

Background and archival research combined with community consultation identified a number of Native Hawaiian cultural practices and culturally-significant resources in Kaunakakai Ahupuaʻa. Archival research and communications with knowledgeable individuals who have generational ties to the area have identified a range of these practices, many of which center on the area surrounding Kaunakakai Harbor and continued access to its shores and marine resources. This included the use of Kaunakakai as a canoe landing site, associated not only with fishing but interisland travel and the military campaigns of the *aliʻi* in the pre-Contact to early post-Contact eras. The coastal waters of

Kaunakakai and southeastern coast of Molokai were noted for the extensive fringing reef which nurtured abundant marine life, including the much sought after *aloalo* (mantis shrimp) in the area of Kaunakakai. The shoreline of Kaunakakai was also the site of Māhinahina Heiau, a *heiau* of reputed *poʻokanaka* class.

Community consultation identified the following potential impacts to cultural practices and culturally-significant resources: potential impacts to marine activities and marine resources, including cultural practices such as paddling and canoe races, fishing, swimming, diving, and surfing. Effects on the health of near-shore and benthic marine ecosystems as well as the right and responsibility of Native Hawaiians to access and protect these environments was of strong concern. The Consultation participants stressed the collective responsibility to *mālama* the marine ecosystems and resources of Kaunakakai and to respect the deep ties of the Hawaiians to the ocean and Kanaloa.

Recommended feasible actions include: (1) establishment of a project point of contact to communicate effectively and transparently with the Kaunakakai canoe clubs and wider Kaunakakai community concerning project impacts and scheduling, and (2) having the designated project point of contact be available to address any concerns and questions during the construction phase of the project.

7.1.5 Lānaʻi Cable Landing Site Study Area

Background research and community consultation efforts identified a range of Native Hawaiian cultural practices and culturally-significant resources in Pālāwai Ahupuaʻa. This included the permanent pre-Contact village and burial area at Mānele, which likely hosted a wide variety of crops including *kalo*, *ʻuala*, *niu*, *milo*, *noni*, *kou*, *hala*, and *wiliwili*. A number of pre-Contact trails ran along the shore and connected the coast with the uplands, and many of these were later developed into post-Contact cart roads. The sand dunes behind Mānele are known to contain burials and have been habitat for nesting seabirds. Freshwater sources seeped from cracks in the rocks into nearshore waters and fresh water could be gathered by those who knew how to dive for it. Marine resources were abundant and carefully managed in Mānele Bay. Post-Contact land use in the area included ranching, shipping, and commercial pineapple agriculture. The Mānele Bay area served as a port, beach hangout, and cliff diving spot.

The primary project impact identified in consultation was the potential for the project to encounter *iwi kūpuna*. Mānele is a known burial area, and previous projects, including construction activities for the Mānele Small Boat Harbor, have disturbed *iwi kūpuna*. Consultation participants recommended that: (1) a *kamaʻāina* representative with generational ties to Lānaʻi be on site as a cultural monitor during construction activities; and (2) that the project work with the community members consulted for this report to identify an appropriate representative for cultural monitoring for the project.

7.1.6 Hawaiʻi Island Cable Landing Site Study Area

Through background and archival research and community consultation efforts, this CIA has identified a range of Native Hawaiian cultural practices and culturally-significant resources in Waiākea Ahupuaʻa, with particular attention to the areas around Hilo Bay, Keaukaha, and the UH

Hilo campus. Although there are a number of LCA awards in the coastal region of Waiākea Ahupuaʻa, none are located near the project area and no potential impacts to these parcels or impediments to their access were identified.

The PACRC portion of the HIFL project area in Hilo is in DHHL lands. This area is connected with, and stewarded by, Keakaha Homesteaders and has strong ties to past and ongoing Native Hawaiian cultural practices, valued resources, and beliefs. The UH Hilo campus portion of the project area lies fully within an established university campus which has already undergone a significant amount of development and disturbance. Although no specific cultural practices or valued resources were identified within this portion of the project area, it was noted that the *ahupuaʻa* of Waiākea is Crown Lands, and that a portion of lease revenue from private projects on Crown Lands should be going back to the State to benefit Native Hawaiians.

Community consultation efforts identified a number of potential resources and practices which could be impacted by the project. This included potential impacts to contemporary fishing practices, fresh and brackish water ponds, disruptions of *hoʻomoana* camping activities in the area, possible impacts to *limu* or *limu* collecting practices at Puhi Bay, interruptions of canoe club activities, disruption of memorial practices like scattering of ashes, and impacts to educational activities. There was also significant concern expressed over drilling and trenching in the ocean, and the potential impacts this could have on fragile ocean ecosystems. Community members also expressed concerns about the safety of the fiber cable, and potential hazards of damaging or otherwise impacting the cable. Participants wanted to make sure the project was aware of and would not interfere with the County's planned improvements to sewage treatment infrastructure. They also expressed a desire to see local people hired for the project wherever possible, and noted that bringing in outside labor can have deleterious consequences for local communities, including driving up rent prices.

Feasible actions that could be taken to reasonably protect Native Hawaiian rights include: (1) maintain clear and transparent communication with community members at all phases of the project; (2) prioritize the Keaukaha community, particularly the Hawaiian Homestead communities, in determining potential project impacts and desired mitigation outcomes; (3) maintain community consultation throughout the duration of the project, including (but not limited to) consultation in compliance with Section 106 and HRS 6E; (4) prioritize hiring local and Native Hawaiian community members for the project, including support for training opportunities to ensure local people qualify for skilled positions; (5) work with the Keaukaha Community Association to identify an appropriate cultural practitioner with ties to Keaukaha to serve as a cultural monitor and community liaison during project activities; (6) work with DHHL and Hawaiian Homestead communities to contribute to plans to provide better, more affordable connectivity to homestead lands; (7) identify and select a project design that is anticipated to be least impactful to people and ocean ecosystems; (8) contribute to ocean and nearshore habitat restoration work, possibly in collaboration with ongoing UH research and initiatives; and (9) share the results of project research and outcomes to community members, through implementation of interpretive signage or other means of dissemination.

7.1.7 Overall Study Area

The HIFL Project includes cable landing sites across six of the major Hawaiian Islands. Archival research, previous archaeological and ethnographic studies, and consultation with knowledgeable individuals have provided insights into the cultural landscapes within which this project will be situated. In various portions of the HIFL project area, CIA participants raised concerns about the potential for the project to impact offshore and nearshore marine ecosystems and environments, which have been, and continue to be, vital for Native Hawaiian communities. Some portions of the project area are in areas that are in close proximity to burial areas where *iwi kūpuna* have been laid to rest, and a concern for inadvertently impacting *iwi kūpuna* during project construction has been expressed in those areas. CIA participants stressed that the project team ensure open and transparent dialogue with each of the communities who live in, and care for, the land and sea that the cables will traverse. During the consultation process, participants suggested cultural monitors and community liaisons with relevant cultural experience and generational ties to each specific area work closely with the project team to ensure that the project progresses in a responsible and respectful manner.

8.0 REFERENCES CITED

Adler, J., and R.M. Kamins
1986 *The Fantastic Life of Walter Murray Gibson, Hawaii's Minister of Everything*. University of Hawai'i Press, Honolulu.

Ahlo, H.M., and R.J. Hommon
1983 *An Archaeological Reconnaissance Survey of the Site of the Proposed Solid Waste Processing and Resource Recovery Facility, Honouliuli, Ewa, Oahu*. Belt Collins & Associates, Honolulu.

Aikau, H.K., and V.V. Gonzalez eds.
2019 *Detours: A Decolonial Guide to Hawai'i*. Duke University Press, Durham.

Akoi, R.
1989 *Ku'u Home I Keaukaha: An Oral History*. Hui Ho'omau O Keaukaha Panaewa.

Alexander, W.D.
1873 *Map of Honouliuli, Oahu*. On file at Hawaii Land Survey Division, Department of Accounting and General Services, Honolulu.
1875 *Map of Honouliuli, Oahu*. On file at Hawaii Land Survey Division, Department of Accounting and General Services, Honolulu.
1891 *Hilo Town and Vicinity*. On file at Hawaii Land Survey Division, Department of Accounting and General Services, Honolulu.

Apple, R., and P. Apple
1972 *"Lot Kamehameha's Axis Deer."* Honolulu Star-Bulletin.

Apple, R.A.
1965 *Trails: From Steppingstones to Kerbstones*. Bishop Museum Special Publication (Vol. 53), Honolulu.

Ashdown, I.
1976 *Ha'ilono Mele*. Vol II. No. 6. The Hawaiian Music Foundation, Honolulu.

Athens, J.S.
1991 *Archaeological Investigations at the Canoe Shed Complex of Hulopo'e Bay, Lana'i, Site 50-40-98-85*. International Archaeological Research Institute, Inc., Honolulu.

Athens, J.S., M.W. Kaschko, J.R. McNeill, D.J. Welch, and S. Wickler
1992 *Archaeological Investigations at Hulopoe Beach, Lana'i, Hawaii Part I: Archaeological Site and Feature Descriptions, Mapping, and Excavations*. International Archaeological Research Institute, Inc., Honolulu.

Athens, J.S., J.R. McNeill, M.J. Tomanari-Tuggle, D.J. Welch, and S. Wickler
2000a *Archaeology on a South Coast Landscape Hulopo'e, Lana'i, Hawai'i Volume II: Site and Feature Descriptions*. International Archaeological Research Institute, Inc., Honolulu.
2000b *Archaeology on a South Coast Landscape Hulopo'e, Lana'i, Hawai'i Volume III: Site and Feature Descriptions*. International Archaeological Research Institute, Inc., Honolulu.

Athens, J.S., and C.L. Silva
1983 *Archaeological and Historical Investigations at a Property Near Kaunakakai Wharf, Island of Molokai, Hawaii*. Archeological Consultant, Honolulu.

Athens, S., J.V. Ward, H.D. Tuggle, and D.J. Welch
2002 *Avifaunal Extinctions, Vegetation Change, and Polynesian Impacts in Prehistoric Hawai'i*. Archeology in Oceania(37): 57–78.

Athens, S.J., J.V. Ward, D.H. Tuggle, and D.J. Welch
1999 *Environment, Vegetation Change, and Early Human Settlement on the ʻEwa Plain: A Cultural Resource Inventory of Naval Air Station, Barbers Point, Oʻahu, Hawaiʻi Part III: Paeloenvironmental Investigations*. International Archaeological Research Institute, Inc., Honolulu.

Baggs, P.N., and M.F. Dega
2016 *Archaeological Monitoring Report for the 215 Wakea Avenue Flexible Warehouse Project at the Former Maui Land and Pineapple Cannery, Kahului, Wailuku Ahupuaʻa, Wailuku District, Island of Maui, Hawaiʻi [TMK: (2) 3-7-002:001]*. Scientific Consultant Services, Inc., Honolulu.

Barna, B., and L.M.U. Kepaʻa
2023 *Archaeological Monitoring Report for the Kalanianaʻole Avenue Reconstruction Project, Kamehameha/Railroad Avenue to Kauhane Avenue, County Job No. E 435 2A TMKs: (3) 2-1-006 (Por.), 007 (Por.), 008 (Por.), 009 (Por.), 010 (Por.), and 020 (Por.) Waiākea Ahupuaʻa South Hilo District Island of Hawaiʻi*. ASM Affiliates, Hilo.

Beardsley, F.
2001 *Phase II - Intensive Survey and Testing, Naval Air Station Barbers Point, Land of Honouliuli, ʻEwa District, Island of Oʻahu*. Pacific Rim Research Unit, University of California, Riverside.

Beasley, T.D.
1899 *Oahu, Hawaiian Islands*. David Rumsey Map Collection, David Rumsey Map Center, Stanford Libraries.

Beckwith, M.
1940 *Hawaiian Mythology*. Yale University Press, New Haven.

Belluomini, S.A., T.M. Yucha, D.W. Shideler, and H.H. Hammatt
2017 *Archaeological Inventory Survey Report for the Proposed Kapolei Corporation Yard, Kalaeloa, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu TMK: [1] 9-1-026:004*. Cultural Surveys Hawaiʻi, Inc., Kailua.

Bennett, J.D.
2003 *The Coastal Defenses of Kauai, T.H., 1942-1944*. The Coastal Defense Journal 17(2): 66–77.

Bennett, W.C.
1931 *The Archaeology of Kauai*. Bulletin 80. Bishop Museum, Honolulu.

Berrigan, D.M., A.E. Haun, and J.D. Henry
2008 *Archaeological Monitor Report Mānele Small Boat Harbor Lands of Kamao and Palawai, Lahaina District, Island of Lanai (TMK: [2]-4-9-017:002, 006)*. Haun & Associates, Kea'au.

Bishop, A.
1854 *Ewa Station Reports for 1854*. Microfilm. Hawaiian Mission Children's Museum, Honolulu.

Bond, J.
2015 *West Oahu Leina a Ka Uhane Spirit Pathway Recognized by Federal Transit Administration*. Honouliuli Ewa Traditional Cultural Properties. http://honouliuli.blogspot.com/2015/07/Leina-a-ka-uhane.html.

Borthwick, D., J. Collins, W.H. Folk, and H.H. Hammatt
1993 *Archaeological Survey and Testing of Lands Proposed for Research and Technology Lots at the University of Hawaii at Hilo (TMK 2-4-01:7 and 41)*. Cultural Surveys Hawaiʻi, Inc., Kailua.

Borthwick, D.F., and H.H. Hammatt
1994 *Archaeological Inventory Survey of a Portion of Drainage System A, Kaunakakai, Molokaʻi (TMK: 5-3-02:Por.72; 5-3-03: Por.01 ; 5-3-09:Por. 17)*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Briggs, V.L.
1926 *Experiences of a Medical Student in Honolulu, and on the Island of Oahu*. David D. Nickerson Co., Boston.
Brown, and M.D. Monsarrat
1878 *Lanai, Government Survey*.
Buke Mahele
1848 *Buke Kakau Paa No Ka Mahele Aina i Hooholoia Iwaena o Kamehameha III a Me Na Lii a Me Na Konohiki Ana Hale Alii, Honolulu, Ianuari, 1848*. Honolulu. https://llmc.com/openaccess/docDisplay5.aspx?textid=43596336.
Bureau of Ocean Energy Management (BOEM)
2017 *The Unseen Landscape: Inventory and Assessment of Submerged Cultural Resources in Hawaiʻi*. Maritime Heritage Program, Office of National Marine Sanctuaries, National Atmospheric and Oceanic Administration, and Department of Commerce, Silver Spring.
Bushnell, K.W., D. Shideler, and H.H. Hammatt
2004 *Cultural Impact Assessment for the Kapaʻa Relief Route; Kapaʻa, Waipouli, Olohena, Wailua and Hanamāʻulu, Island of Kauaʻi*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Campbell, S.M.
1994 *Register of the Ewa Plantation Company 1891–1960*. ʻEwa.
Campbell, The Estate of James
2003 *James Campbell Esq*. Electric Pencil.
Carlson, A.K., and P.H. Rosendahl
1990 *Archaeological Inventory Survey, Campbell Industrial Park—Kami Loop Subdivision*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
Chiddix, J., and M. Simpson
2004 *Next Stop Honolulu! Oahu Railway & Land Company 1889-1971*. Sugar Cane Press, Honolulu.
Chinen, J.J.
1958 *The Great Mahele: Hawaii's Land Division of 1848*. University of Hawaiʻi Press, Honolulu.
Ching, F., and G. Austin
1971 *An Archaeological Reconnaissance of the Proposed Manele Diversion Channel Project, Job H.C. 4001 Manele Bay, Lanai Island, Hawaii*. Department of Land and Natural Resources - State Parks, State of Hawaiʻi.
Ching, F.K.W., P.B. Griffin, W.P. Kikuchi, N.H. Albrecht, J.C. Belshe', and C. Stauder
1973 *The Archaeology of Puna, Kauaʻi: Niumalu Ahupuaʻa, Loko Kuapa O Alekoko*. Archaeological Research Center Hawaii, Lawai.
Christensen, C.C., and P.V. Kirch
1986 *Nonmarine Mollusks and Ecological Change at Barbers Point, O'ahu Hawai'i*. Bishop Museum Occasional Paper (Vol. 26), Honolulu.
Clark, M.D., J.D. Nelson, and R.B. Rechtman
2012 *An Archaeological Inventory Survey for the Proposed Kapiʻolani Street Extension Project (TMKs: 3-2-4-04:181, 182, and 3-2-4-56:029), Waiākea Ahupuaʻa, South Hilo District, Island of Hawaiʻi*. Hilo, Rechtman Consulting, Inc.

Clark, S.D.
1979 *Archaeological Reconnaissance Survey for Barbers Point Beach Park Improvements, Ewa, Oahu (TMK: 9-1-26:27)*. Prepared for City and County of Honolulu. Department of Parks and Recreation, Kualoa Archaeological Research Project, Honolulu.
Cluett, C.
2015 *A Heart for Higher Education*. *Molokai Dispatch Inc.* https://themolokaidispatch.com/a-heart-for-higher-education/, accessed August 11, 2025.
Cobb, J.N.
1905 *The Commercial Fisheries of the Hawaiian Islands in 1903*. Government Printing Office, Washington.
Compton, C.W.
2005 *The Making of the Ahupuaʻa of Lāʻie Into a Gathering Place and Plantation: The Creation of an Alternative Space to Capitalism*. Brigham Young University, Provo.
Conde, J.C., and G.M. Best
1973 *Sugar Trains, Narrow Gauge Rails of Hawai'i*. Glenwood Publishers, Felton.
Condit, J.J., and J. Allen
2011 *Archaeological Monitoring, Hawaiian Electric Company Generator and Substation Sites, Campbell Industrial Park, Honouliuli Ahupuaa, Ewa District, Island of Oahu, State of Hawaii Portions of Oahu Island Tax Map Keys (TMK) 9-1-014:014 and 9-1-026:038*. International Archaeological Research Institute, Inc., Honolulu.
Cooke, G.P.
1949 *Moolelo o Molokai A Ranch Story of Molokai*. Honolulu Star-Bulletin.
Cooke, S.P.
1963 *"On Axis Deer in Hawaii."* Honolulu Star-Advertiser.
Corbin, A.B., A.T. Walker, L. Kalima, H.W. Smith, and S.T. Goodfellow
2002 *Archaeological Inventory Survey Ocean Bay Plantation at Hanamāʻulu Land of Hanamāʻulu, Lihuʻe District, Island of Kauaʻi*.(TMK:4-3-7-3:1;4-3-9-5:5). Paul H. Rosendahl, Ph.D., Inc., Hilo.
Cordle, S., and M.F. Dega
2007 *An Archaeological Monitoring Report for the Proposed Baldwin High School Eight Classroom Building (GPC 20003/51) [County/DSA] Ahupua'a of Wailuku, District of Wailuku, Island of Maui, Hawai'i [TMK: (2) 3-8-007:004]*. Scientific Consultant Services, Inc., Honolulu.
Coulter, J.W.
1931 *Population and Utilization of Land Sea in Hawaii, 1853*. Bulletin 88. Bishop Museum Press, Honolulu.
Damon, E.M.
1931 *Koamalu: A Story of Pioneers on Kauai, and of What They Built in That Island Garden*. Honolulu Star-Bulletin Press.
Davis, B.D.
1977 *Cultural Reconnaissance Report Kapaʻakea Homestead Flood Control Project, Kapaʻakea, Molokaʻi Island, Hawaiʻi State of Hawai'i*. Archaeological Research Center Hawaiʻi, Inc., Honolulu.
Davis, B.D.
1988 *Report on Archaeological Reconnaissance at the Proposed HECO Generating Station, Barbers Point, Honouliuli 'Ewa, Oʻahu TMK 9-1-31*. International Archaeological Research Institute, Inc., Honolulu.

1989 *Report on Archaeological Investigations at the Proposed HECO Generating Station, Barbers Point, Honouliuli ʻEwa, Oʻahu. TMK 9-1-31*. International Archaeological Research Institute, Inc., Honolulu.
1990 *Archaeological and Paleontological Investigations at the Proposed HECO Barbers Point Generating Station, Honouliuli, ʻEwa, Oʻahu*. Applied Research Group, Bishop Museum, Honolulu.

Dean, L.
1991 *The Lighthouses of Hawaiʻi*. University of Hawaiʻi Press, Honolulu.

Dega, M.F., and J. Powell
2003 *Archaeological Monitoring During Phase I of the Kauai Rural Fiber Optic Duct Lines Project, Kauaʻi Island, Hawaiʻi*. Scientific Consultant Services, Inc., Honolulu.

Denfeld, D.C.
1995 *History of Naval Air Station, Barbers Point and Survey of Cold War Facilities. Appendix B in A Cultural Resource Inventory of Naval Air Station, Barbers Point, Oʻahu, Hawaiʻi: Part I: Phase I Survey and Inventory Summary, Archaeological Research Services for the Proposed Cleanup, Disposal and Reuse of Naval Air Station, Barbers Point, Oʻahu, Hawaiʻi (Task 2a)*. International Archaeological Research Institute, Inc., Honolulu.

Department of Land and Natural Resources (DLNR)
1974 *Statewide Inventory of Historic Places*. On file at the Hawaiʻi State Historic Preservation Division (SHPD), Kapolei.

Desha, S.
2000 *Kamehameha and His Warrior Kekūhaupiʻo*. Kamehameha Schools Press, Honolulu.

Desilets, M.
2011 *Archaeological Monitoring for Soil Boring, Kaunakakai Ahupuaʻa, Molokaʻi District, Island of Molokaʻi, Hawaiʻi (TMK 5-3-002-073)*. Garcia and Associates, Kailua.

Devereux, T., and H.H. Hammatt
1998 *Archaeological Monitoring Report for Renovations to the War Memorial Stadium Complex Wailuku, Maui (TMK 3-8-07:55)*. Cultural Surveys Hawaiʻi, Inc., Kailua.
1999 *Archaeological Monitoring Report of the 110-Acre Maui Central Park, Wailuku, Maui. TMK: (2)3-8-07:1 & 3-7-01:2*. Cultural Surveys Hawaiʻi, Inc., Kailua.

Digital Archives of Hawaiʻi
2025 *Welcome to the Digital Archives of Hawaiʻi*. Hawaiʻi State Archives, Department of Accounting and General Services. https://digitalarchives.hawaii.gov/, accessed August 7, 2025.

DiVito, N.J., F. LaChance, R.M.R. Thurman, and T.K. Watson
2021 *Archaeological Literature Review and Field Inspection for the Puhi Development Project, Haʻikū and Niumalu Ahupuaʻa, Puna District, Kauaʻi Island, TMK: [4] 3-3-004:020*. Honua Consulting, Honolulu.

Dorrance, W.H., and F.S. Morgan
2000 *Sugar Islands*. *The 165-Year Story of Sugar in Hawaiʻi*. Mutual Publishing, Honolulu.

Dunn, A.E., A.E. Haun, and S. Goodfellow
1991 *Intensive Archeological Survey and Test Excavations Ewa Marina Community Project – Phase I*. Paul H. Rosendahl, Inc., Hilo.

Dye, T.S., and E.H.R. Jourdane
2006a *Archaeological Assessment for the Proposed Cingular Wireless Kaunakakai Cell Site No. MAUIHI10258, 25 Kaunakakai Place, Kaunakakai, Kona District, Molokaʻi Island, TMK:(2)5-3-1:076 Por*. T. S. Dye & Colleagues, Archaeologists, Inc., Honolulu.

2006b *Archaeological Assessment for the Proposed Verizon Wireless H2 Kaunakakai Cell Site VZW No. 2004005296, Molokaʻi Education Center, 375 Kamehameha V Highway, Kaunakakai, Kona District, Molokaʻi Island, TMK: (2)5-3-:014 Por.* T. S. Dye & Colleagues, Archaeologists, Inc., Honolulu.

Dye, T.S., K.S. Maly, C.E. Sholin, and N.J. DiVito

2013 *Archaeological Inventory Survey Addendum for Mānele Small Boat Harbor Modifications Land of Pālāwai and Kamaʻo, Lāhaina District, Lānaʻi Island TMK: (2) 4–9–017:003*. T. S. Dye & Colleagues, Archaeologists, Inc., Honolulu.

Ellis, W.

1917 *A Narrative of a Tour Through Hawaii, or Owhyhee; with Remarks on the History, Traditions, Manners, Customs, and Language of the Inhabitants of the Sandwich Islands*. Hawaiian Gazette Co., Ltd., Honolulu.

Emerson, N.B.

1915 *Pele and Hiiaka: A Myth from Hawaii*. Honolulu Star-Bulletin Limited, Honolulu.

1998 *Unwritten Literature of Hawaii: The Sacred Songs of the Hula*. Mutual Publishing, Honolulu.

Emory, K.P.

1924 *The Island of Lanai, A Survey of Native Culture*. Bishop Museum Press, Honolulu.

Escott, G.

2013 *An Archaeological Inventory Survey on Approximately 42.6 Acres of Land for the University of Hawaiʻi-Hilo Mauka Acquisition Project, Waiākea Ahupuaʻa, South Hilo District, Island of Hawaiʻi, Hawaiʻi [TMK: (3) 2-4-001:024 and 2-4-056-016]*. Scientific Consultant Services, Inc., Honolulu.

Evslin, L.

2016 *The Living Victims of Kauai's Tourism Economy*. Honolulu Civil Beat. https://www.civilbeat.org/about.

Faʻanunu, A.I., M. Magat, and H.H. Hammatt

2012 *Cultural Impact Assessment for the Kauaʻi Community College Redesignation to Urban District Project, Nāwiliwili, Niumalu, and Haʻikū Ahupuaʻa, Līhuʻe District, Kauaʻi Island: TMK: [4]-3-4-007-001, [4]-3-4-007-002, [4]-3-4-007-003, and [4]-3-4-007-006*. Cultural Surveys Hawaiʻi, Inc, Kailua.

Faʻanunu, A.I., M. Simonson, and H.H. Hammatt

2011 *Cultural Impact Assessment for the Kaunakakai Ferry Systems Improvements Project, Kaunakakai Wharf, Kaunakakai Ahupuaʻa, Molokaʻi District, Molokaʻi Island TMK: [2] 5-3-001:011 (Por.)*. Cultural Surveys Hawaiʻi, Inc., Kailua.

Fager, M.W., and R.L. Spear

2000 *Monitoring During Wailua Golf Course Irrigation System Renovation, County of Kauaʻi, Department of Public Works Division of Parks and Recreation Wailua Ahupuaʻa, Puna District, Kauaʻi (TMK:3-9-05: Portion 1)*. Scientific Consultant Services, Inc., Honolulu.

FAI Architects

2023a *Reconnaissance Level Survey for Ichiro "Iron" Maehara Baseball Stadium 211 Kanaloa Avenue Wailuku, Maui Island, Hawaii 96793 TMK: (2) 3-8-007:094*. FAI Architects, Honolulu.

2023b *Reconnaissance Level Survey for the War Memorial Complex Including the War Memorial Football Stadium and Satoki Yamamoto Track and Field Facility, War Memorial Gymnasium, and Coach Soichi Sakamoto Pool 201 Kanaloa Avenue Wailuku, Maui Island, Hawaii 96793 TMK: (2) 3-8-007:055*. FAI Architects, Honolulu.

Fechner, C.C., and P.L. Cleghorn
2017 *Archaeological Monitoring Report for the Proposed Stormwater Improvement Project at the Schnitzer Steel Hawaii Corp. Facility in Kapolei Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu [TMK: (1) 9-1-026:025]*. Pacific Legacy, Inc., Kailua.

Fechner, C.C., J.A. Panuska, J.A. Swift, and M.A. Mulrooney
2025 *Archaeological Monitoring Report for the Improvements to the Department of Hawaiian Home Lands Water System on Molokaʻi Lands in Pālāʻau, Hoʻolehua, Nāʻiwa, Kahanui, and Kalamaʻula Ahupuaʻa Kona District, Island of Molokaʻi [TMK (2) 5-2-002:999; (2) 5-2-005:999; (2) 5-2-006:999; (2) 5-2-007:029, 030, 035, 039, 040, 055, 076-080, 082-085, 090, 999; (2) 5-2-008:001, 002, 004-006, 029, 043, 044, 046, 079, 084, 086, 091, 099, 102, 122, 123, 999; (2) 5-2-009:012, 016, 018, 026, 999; (2) 5-2-010:001-004, 007; (2) 5-2-012:034, 035, 999; (2) 5-2-013:010, 020, 021; (2) 5-2-021:999; (2) 5-2-023:009; (2) 5-2-024:999; (2) 5-2-025:999; (2) 5-2-032:068, 070; and (2) 5-2-033:047-053, 058, 061]*. Pacific Legacy, Inc., Kailua.

Fielder, B.
2005 *Cultural Impact Study for the Palai Stream Flood Control Project, Hilo, Hawaii*. Pacific Legacy, Inc., Kailua.

Folk, W.H., N. Kamai, and H.H. Hammatt
2021 *Archaeological Monitoring Report for the Island School Project Nāwiliwili and Niumalu Ahupuaʻa, Līhuʻe District, Kauaʻi TMK: [4] 3-8-018:005*. Cultural Surveys Hawaiʻi, Inc., Kailua.

Foote, D.E., E.L. Hill, S. Nakamura, and F. Stephens
1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii*. U.S. Department of Agriculture, Soil Conservation Service, Government Printing Office, Washington D.C.

Fornander, A.
1917a *Fornander Collection of Hawaiian Antiquities and Folk-Lore: The Hawaiian Account of the Formation of Their Islands and Origin of Their Race, with the Traditions of Their Migrations, Etc., as Gathered from Original Sources*. Memoirs of the Bernice Pauahi Bishop Museum Volume IV – Part I. Bishop Museum Press, Honolulu.
1917b *Fornander Collection of Hawaiian Antiquities and Folk-Lore: The Hawaiian Account of the Formation of Their Islands and Origin of Their Race, with the Traditions of Their Migrations, Etc., as Gathered from Original Sources*. Memoirs of the Bernice Pauahi Bishop Museum Volume IV – Part III. Bishop Museum Press, Honolulu.
1917c *Fornander Collection of Hawaiian Antiquities and Folklore: The Hawaiian Account of the Formation of Their Islands and Origin of Their Race with the Traditions of Their Migrations, Etc., as Gathered from Original Sources*. Memoirs of the Bernice Pauahi Bishop Museum Volume IV – Part I. Bishop Museum Press, Honolulu.
1918 *Fornander Collection of Hawaiian Antiquities and Folklore: The Hawaiians' Account of the Formation of Their Islands and Origin of Their Race, with the Traditions of Their Migrations, Etc., as Gathered from Original Sources*. Memoirs of the Bernice Pauahi Bishop Museum Volume V – Part I, vol.Vol V-Part I. Bishop Museum Press, Honolulu.
1919 *Fornander Collection of Hawaiian Antiquities and Folklore: The Hawaiians' Account of the Formation of Their Islands and Origin of Their Race, with the Traditions of Their Migrations, Etc., as Gathered from Original Sources*. Memoirs of the Bernice Pauahi Bishop Museum Volume V – Part III, vol.Vol. V-Part III. Bishop Museum Press, Honolulu.

Fredericksen, D.L., and E.M. Fredericksen
2002 *An Archaeological Inventory Survey of the Y. Hata Property in Wailuku Ahupuaʻa, District of Wailuku, Island of Maui (TMK: 3-4-27:01)*. Xamanek Researches, LLC, Pukalani.

Fredericksen, D.L., E.M. Fredericksen, and W.M. Fredericksen
1998 *Archaeological Data Recovery Report for Site 50-50-04-3120 Nisei Veterans Memorial Center TMK: 3-8-07:123 Wailuku Ahupuaʻa, Wailuku District, Maui Island*. Xamanek Researches, LLC, Pukalani.
Fredericksen, E.M.
1997 *Monitoring Report for the Kaiser Permanente Parking Expansion Project, Ahupuaʻa of Wailuku District of Wailuku, Island of Maui (TMK: 3-8-46:08)*. Xamanek Researches, LLC, Pukalani.
2005a *An Archaeological Inventory Survey Report for Work Carried Out on The Kanaloa Avenue Improvements-Kahului Beach Road to Kaʻahumanu Avenue-Project, Wailuku Ahupuaʻa, Wailuku District, Maui Island (Federal Aid Project No. STP-0900 [56]) (TMK: 3-8-25 and 3-7-01: 02 [Portion])*. Xamanek Researches, LLC, Pukalani.
2005b *An Archaeological Monitoring Report for Waiʻehu Beach Road Miscellaneous Drainage Improvements from the Vicinity of Lower Main Street to Eha Street, Wailuku Ahupuaʻa, Wailuku District, Maui Island (TMK: 3-8-007)*. Xamanek Researches, LLC, Pukalani.
2007 *Supplemental Archaeological Assessment Testing and Survey for the Maui Palms Hotel Redevelopment Project, Wailuku Ahupuaʻa, Wailuku District, Maui Island (TMK: [2] 3-7-03 Por. of 007 and 009)*. Xamanek Researches, LLC, Pukalani.
Fredericksen, E.M., W.M. Fredericksen, and D.L. Fredericksen
1994 *An Inventory Survey of a 10-Acre Parcel of Land, Maui Central Park Parkway, Wailuku Ahupuaʻa, Wailuku District, Maui Island (TMK: 3-8-07:125)*. Xamanek Researches, LLC, Pukalani.
Fredericksen, W.M., and D.L. Fredericksen
1992a *Archaeological Inventory Survey for the Parking Lot Expansion and Retention Basin on Maui Community College Campus (TMK 3-8-07: 40 & 43) Ahupuaʻa of Wailuku, District of Wailuku, Island of Maui.* Xamanek Researches, LLC, Pukalani.
1992b *An Archaeological Inventory Survey for Owa Subdivision, A & B Properties, Inc. Kahului, Maui, Hawaii (TMK 3-8-07:38)*. Xamanek Researches, LLC, Pukalani.
1992c *An Inventory Survey of a Parcel of Land (TMK 3-8-07: 123), Located in the Ahupuaʻa of Wailuku, District of Wailuku, Island of Maui*. Xamanek Researches, LLC, Pukalani.
1995 *Archaeological Inventory Survey and Subsurface Testing at the Site of Keiki Zoo Maui (TMK: 3-8-07: Por. 1)*. Xamanek Researches, LLC, Pukalani.
Frey, J.J., and E.M. Fredericksen
2009 *An Archaeological Monitoring Report for the Kahului Concrete Sewer Laterals Replacement Project, Wailuku Ahupua'a, Wailuku District, Island of Maui (Various TMKs in Kahului)*. Xamanek Researches, LLC, Pukalani.
Frierson, B.
1972 *A Study of Land Use and Vegetation Change: Honouliuli, 1790-1925*. Geography 750.
Frye, L., and B. Resnick
2013 *Ewa Plain Battlefield, National Register of Historic Places Inventory/Nomination Form; NRIS Reference Number 16000273*. GAI Consultants, Homestead, Pennsylvania.
Fuentes, R.N., A.K. Alvarez, M. Pinsonneault, and J. Steele
2022 *Archaeological Inventory Survey for Proposed New Improvements for Wenqiang Lin Residence 444 Kaʻao Circle Located in Wailuku Ahupuaʻa, Pūʻali Komohana District, Island of Maui TMK: (2) 3-8-031:004*. Atlas Archaeology, Wailuku.
Gay, L.K.
1965 *True Stories of the Island of Lanai*. Mission Press, Honolulu.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.L. Chen, P.S. Chu, J.K. Eischeid, and D.M. Delparte
2013 *Online Rainfall Atlas of Hawai'i*. Bulletin of the American Meteorological Society 94:313-316.

Gibson, W.M.
1867 *"The Tomb of Puupehe"*, as Told to Walter Murray Gibson by Piianaia, a Kupuna of Lanai. Hawaiian Gazette.

Gomes, A.
2016 *"They Fought the Good Fight. They Fought the Dying Fight."* Honolulu Star-Advertiser.

Gross, R., D. Byerly, A.E. Sims, and C. Craft
2022 *Archaeological Monitoring Report for Former Kaunakakai Chevron Bulk Storage Terminal, Kaunakakai Ahupua'a, Kona District, Moloka'i Island, Hawai'i, TMKs (2) 5-3-001:097 and 100 and Portions of (2) 5-3-001 :001, 002, 009, 010, 065, and Kaunakakai Place Right-of-Way*. Kleinfelder/GANDA, Honolulu.

Grove Farm
2025 *The History of Puhi Park*. *Grove Farm*. https://www.grovefarm.com/news/a-history-of-puhi-park., accessed August 22, 2025.

Grove Farm Museum
2025 *Grove Farm History*. *Grove Farm Museum*. http://www.grovefarm.org/history.

Groza, R., and H.H. Hammatt
2010 *Archaeological Monitoring Report For Wastewater Improvements at Kalaeloa City and County Beach Park (Also Known as Barbers Point Beach Park), Honouliuli Ahupua'a, 'Ewa District, O'ahu TMK: [1] 9-1-026:027*. Cultural Surveys Hawai'i, Inc., Kailua.

Hall, W.L.
1904 *The Forests of the Hawaiian Islands*. United States Department of Agriculture, Bureau of Forestry, Government Printing Office, Washington.

Hammatt, H.H.
2001 *Archaeological Assessment of the Proposed Sandwich Isles Communication Fiberoptic Cable Project Within Approximately 37 Miles (59.7 Kilometers) of Road Corridor on the Island of Moloka'i*. Cultural Surveys Hawai'i, Inc., Kailua.

Hammatt, H.H., and R. Chiogioji
1998 *Archaeological Assessment of an Approximately 11.5 Kilometer-Long Portion of the Kaumuali'i Highway Corridor Through Nāwiliwili, Ha'ikū, and Kōloa Ahupua'a, Island of Kaua'i.* Cultural Surveys Hawai'i, Inc., Kailua.

Hammatt, H.H., and V.S. Creed
1993 *Archaeological Inventory Survey of 61.6 Acres in Nāwiliwili, Kaua'i*. Cultural Surveys Hawai'i, Inc., Kailua.

Hammatt, H.H., and D.W. Shideler
1995 *Data Recovery Plan for Archaeological Sites in the Proposed Barbers Point Expansion Area (TMK 9-1-14:2)*. Cultural Surveys Hawai'i, Inc., Kailua.
2004 *Archaeological and Cultural Impact Evaluation Study in Support of Development of the "One-Stop Center, Kaua'i Community College" Project*. Cultural Surveys Hawai'i, Inc., Kailua.

Handy, E.S.C.
1940 *The Hawaiian Planter, Volume I: His Plants, Methods, and Areas of Cultivation*. Bulletin 161. Bishop Museum Press, Honolulu.

Handy, E.S.C., and E.G. Handy
1972 *Native Planters in Old Hawai'i: Their Life, Lore, and Environment*. Bishop Museum Press, Honolulu.

Harvey, F.E.
1903 *Hawaiian Territorial Survey Map of a Portion of Lanai, Hawaiian Islands*. Registered Map 2227.
1927 *Map of Land Court Territory of Hawaii Application No. 0862*.
Haun, A.E.
1991 *An Archeological Survey of the Naval Air Station, Barber's Point, Oʻahu, Hawaiʻi*. Applied Research Group, Bishop Museum, Honolulu.
Haun, A.E., and D. Henry
2000 *Archaeological Inventory Survey Hilo Harbor Facilities Expansion, TMK: 3-2-1-09: 2, 12, 41, 42 and TMK: 3-2-1-07: 20-37, Land of Waiakea, South Hilo District, Island of Hawaii*. Haun & Associates, Keaʻau.
Hawaii Herald
1915 *"Woman Held by Ghostly Hand."* Hawaii Herald.
Hawaiʻi State Constitution Article IX, §7
Hawaiʻi State Constitution Article IX, §9
Hawaiʻi State Constitution Article XII, §7
Hawaiʻi State Digital Archives
1912 *Reference No. PPWD-11-6-002. Photograph Titled "Molokai – (Beach) Kaunakakai" by R.J. Baker*. Photograph Titled "Kaunakakai Landing." https://digitalarchives.hawaii.gov/item/ark:70111/1xLx, accessed August 22, 2025.
n.d *Reference No. AN-PNS-173-1994.069 "Kaunakakai Landing."* Photograph. https://digitalarchives.hawaii.gov/item/ ark:70111/50F5.
n.d *Reference No. GPNBAK-1-26. "George Cooke."* Photograph. https://digitalarchives.hawaii.gov/item/ ark:70111/2kFF, accessed August 22, 2025, b.
Hawaii Tribune-Herald
1926 *"Hawaiian Legend Again Proved True by Latest Mauna Loa Lava Activity*." Hawaii Tribune-Herald.
Hawaiian Ethnological Notes Collection (HEN)
1861 *"He Wahi Moolelo" by S.K. Kawailiula*. Mary Kawena Pukui, trans. Published in Ka Hae Hawaii on October 9, 1861. Bishop Museum Press, Honolulu.
Hawaiian Gazette
1912 *"Judge Plans Oyster Beds for Hawaii."* Hawaiian Gazette.
Heidel, M., D.F. Borthwick, A. Bush, and H.H. Hammatt
1998 *Archaeological Data Recovery Report for Proposed Drainage System "A" at Kaunakakai, Molokai (TMK 5-3-02.Por. 72: 5-3-63.Por. 01; 5-3-09:Por, 17)*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Heidel, M., T. Devereux, L. Pyle, and H.H. Hammatt
1996 *Archaeological Reconnaissance with Subsurface Testing for Proposed 110-Acre Maui Central Park, Wailuku, Maui (TMK: 8-8-07:1 and 3-7-01:2)*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Heidel, M., L. Pyle, and H.H. Hammatt
1997 *Archaeological Inventory Survey of the 110-Acre Maui Central Park, Wailuku, Maui (TMK: 3-8-07:1 and 3-7-01:2)*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Henke, L.A.
1929 *A Survey of Livestock in Hawaii*. University of Hawaiʻi, Honolulu.
Henry, J.D., A.T. Walker, K. Maly, and P.H. Rosendahl
1993 *Archaeological Inventory Survey, Grove Farm Lihue/Puhi Project Area, Land of Nawiliwili, Niumalu, and Haiku, Lihue District, Island of Kauai*. Paul H. Rosendahl, Ph.D., Inc., Hilo.

Hibbard, D.J., and W. Wichman
2008 *Lihue Plantation Company, Sugar Mill Building, Haleko Road, Lihue, Kauai County, Hawaii. HAER HI-82*. Historic American Engineering Record, National Park Service, U.S. Department of the Interior, Washington D.C.
Hilo Tribune-Herald
1927 *"Fifty New Homesteads to Be Available at Keaukaha After January 1."* Hilo Tribune-Herald, December 28.
Hodara, R., and M.F. Dega
2015a *An Archaeological Assessment Report for the 215 Wakea Avenue Flexible Warehouse Project at the Former Maui Land and Pineapple Cannery, Kahului, Wailuku Ahupuaʻa Wailuku District Island of Maui, Hawaiʻi [TMK: (2) 3-7-002:001]*. Scientific Consultant Services, Inc., Honolulu.
2015b *An Archaeological Monitoring Report for a 0.76-Acre Parcel in Wailuku, Wailuku Ahupuaʻa, Wailuku District, Island of Maui, Hawai'i [TMK: (2) 3-8-037:028]*. Scientific Consultant Services, Inc., Honolulu.
Hommon, R., and H.M. Ahlo Jr.
1984 *Archaeological Test Excavations at the Site of the Proposed Solid Waste Processing and Resource Recovery Facility, Honouliuli, ʻEwa, Oʻahu*. Science Management Inc., Honolulu.
Honolulu Advertiser
1941 *"War Brought to Maui by Attack on Kahului."* Honolulu Advertiser.
Honolulu Star-Bulletin
1936 *"Coney Family of Kauai Carries on Old Fishing Traditions"* by Clarice B. Taylor. *Honolulu Star-Bulletin*: 45 and 51.
2010 *"UH Regents Might Rename Maui CC." The Honolulu Star-Bulletin*.
Hopkins, J.M.C.
2022 *Kaneikawaiola Ma Manoa: The Life-Giving Waters of Manoa and a History of Water Rights in Hawaiʻi from Antiquity to 1900*. Unpublished Ph.D. Dissertation, History, University of Hawaiʻi at Mānoa.
Huapala
1997 *Ka Uluwehi O Ke Kai (Plants of the Sea), Written and Translated by Edith Kanakaʻole*. Huapala: Hawaiian Music and Hula Archives, Compiled by Kaiulani Kanoa-Martin. https://www.huapala.org/.
Hungerford, J.B.
1963 *Hawaiian Railroads: A Memoir of the Common Carriers of the Fiftieth State*. Hungerford Press, Reseda.
Hunkin, N., D. Shideler, and H.H. Hammatt
2014 *Archaeological Inventory Survey for the Island School Project, Nāwiliwili Ahupuaʻa, Līhuʻe District, Kauaʻi Island, TMK: (4) 3-8-002:016*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Hunt, T.L., and M.J. McDermott
1994 *Archaeological Inventory Survey Puʻainako Street Extension Project, Lands of Waiakea, Kukuau 1 and 2, and Ponahawai, South Hilo District, Island of Hawaiʻi*. Terry Hunt, Honolulu.
ʻĪʻī, J.P. (M. K.P., translator)
1959 *Fragments of Hawaiian History*. Bishop Museum Press, Honolulu.
Images of Old Hawaiʻi
2024 *Līhuʻe, by Peter T. Young*. https://imagesofoldhawaii.com/lihu%CA%BBe/., accessed August 15, 2025.

Inouye, F.T., and E.J. Kormondy
2001 *The University of Hawai'i-Hilo: A College in the Making*. University of Hawai'i Press, Honolulu.
Island School
2025 *Island School: A Brief History*. *Island School*. https://www.ischool.org/about-island-school/history.
Jackson, G.E.G.
1884 *Barbers Point, Oahu. Registered Map 1351*. On file at Hawaii Land Survey Division, Department of Accounting and General Services, Honolulu.
James, H.F.
1995 *Prehistoric Extinctions and Ecological Changes on Oceanic Islands*. In Vitousek, P.M., L.L.
Joesting, E.
1984 *Kauai: The Separate Kingdom*. University of Hawaii Press and Kauai Museum Association, Honolulu.
Jones, C.A., and R.V. Osgood
2015 *From King Cane to the Last Sugar Mill: Agricultural Technology and the Making of Hawai'i's Premier Crop*. University of Hawai'i Press, Honolulu.
Ka Pa'akai O Ka 'Āina v. Land Use Commission, 94 Hawai'i 31, 7 P.3d 1068 (Haw. 2000)
Kalipi v. Hawaiian Trust Co., Ltd., 66 Hawai'i 1, 656 P.2d 745 (Haw. 1982)
Kamai, N., G. Ida, R. Groza, and H.H. Hammatt
2016 *Archaeological Inventory Survey Report for the Kaua'i Community College Rezone Campus Project, Ha'ikū, Niumalu, Nāwiliwili Ahupua'a, Līhu'e District, Kaua'i. TMKs: [4] 3-4-007:001, 002, 003, and 006*. Cultural Surveys Hawai'i, Inc., Kailua.
Kamakau, S.M.
1961 *Ruling Chiefs of Hawai'i*. Kamehameha Schools Press, Honolulu.
Kamakau, S.M.
1991 *Tales and Traditions of the People of Old*. Bishop Museum Press, Honolulu.
2000 *Ka Po'e Kahiko: The People of Old*. Bishop Museum Press, Honolulu.
Kame'eleihiwa, L.
1992 *Native Land and Foreign Desires: Pehea Lā E Pono Ai?* Bishop Museum Press, Honolulu.
Kane, S.S.
2011 *Cultural Kapolei*. Self-published, Kapolei.
Kapuni-Reynolds, H., and W.M. Waipā
2019 *"Nā Pana Kaulana O Keaukaha: The Storied Places of Keaukaha."* In *Detours: A Decolonial Guide to Hawai'i*. Aikau, H.K. and V.V. Gonzalez, eds. Duke University Press, Durham.
Kapuni-Reynolds, K.K.
2024 *Ku'u Home 'O Keaukaha: He Lei Mo'olelo No Ka 'Āina Aloha (My Home, Keaukaha: A Lei of Stories for Beloved Lands)*. A dissertation submitted to the Graduate Division of the University of Hawai'i at Mānoa in partial fulfillment of the requirements for the degree of Doctor of Philosophy in American Studies.
Kaschko, M.
1991a *Archaeological Test Excavations and Site Mapping for the Hulopoe Beach Park Development Area, Island of Lanai, Hawaii*. International Archaeological Research Institute, Inc., Honolulu.
1991b *Archaeological Test Excavations and Site Mapping for the Manele Multi-Family Residential Development Area, Island of Lanai, Hawaii*. International Archaeological Research Institute, Inc., Honolulu.

Kaschko, M., and S. Athens
1987 *Archaeological Inventory Survey of the Hulopoe Bay and Manele Bay Areas Island of Lanai, Hawaii*. International Archaeological Research Institute, Inc., Honolulu.
Kauaʻi Community College
2025 *About Kauaʻi CC*. University of Hawaiʻi, Kauaʻi Community College. https://www.kauai.hawaii.edu/about-kauai-cc.
Kauaʻi Historical Society
1991 *The Kauai Papers*. Kauaʻi Historical Society, Līhuʻe.
Kelly, M.
1991 *"Notes on the History of Honouliuli."* In Appendix A in Haun 1991. Applied Research Group, Bishop Museum, Honolulu.
Kelly, M., B. Nakamura, and D. Barrère
1980 *Historical Research of Land and Water Use in the Hilo Bay Area since 1775, Island of Hawai'i*. Bishop Museum, Honolulu.
1981 *Hilo Bay: A Chronological History*. Department of Anthropology, Bernice P. Bishop Museum, Honolulu.
Kennedy, J.
1988a *Archaeological Surface & Subsurface Testing Results for TMK 5-3-1:77, Kaunakakai, Island of Molokai*. Archaeological Consultants of Hawaii, Inc., Haleʻiwa.
1988b *Preliminary Reconnaissance Report Concerning TMK: 3-8-07, Located at Kahului, Maui*. Archaeological Consultants of Hawaii, Inc., Haleʻiwa.
1990 *Archaeological Subsurface Testing Results at the Site of the Proposed Maui Community Arts and Cultural Center, TMK:3-8-07, Located at Kahului, Maui*. Archaeological Consultants of Hawaii, Inc., Haleʻiwa.
Kennedy, J., P. Brennan, and S. Ireland
1993 *Archaeological Inventory Survey with Subsurface Testing Report for a Property Located at Portions of TMK: 3-8-07: 1, 40, 125, 117, and 3-7-01: 2, Wailuku Ahupuaʻa*, Wailuku District, Island of Maui. Archaeological Consultants of Hawaii, Inc., Haleʻiwa.
Kikuchi, W.K., and S. Remoaldo
1992 *Cemeteries of Kauaʻi, Volume 1*. Kauaʻi Community College and University of Hawaiʻi, Committee for the Preservation of Hawaiian Language, Art and Culture, Puhi.
Kirkendall, M.A.
2008 *Archaeological Assessment for the Proposed New Science Building at Maui Community College Kahului, Maui TMK (2) 3-8-007: 040*. Pacific Legacy, Inc., Wailuku.
Komori, E.
1983 *Results of an Archaeological Reconnaissance Survey and a Search of Historic Documents, TMK 5-3-01:2, Lots 521 and 522, Kaunakakai, Molokaʻi, Hawaiʻi*. Bishop Museum, Honolulu.
Krause, L., J. Rapoza, A.L. Yates, and H.H. Hammatt
2020 *Archaeological Literature Review and Field Inspection for the Hawaiian Cement Facilities Relocation Project at Kahului Harbor, Wailuku Ahupuaʻa, Wailuku District, Maui Island, TMKs: [2] 3-7-010:003, 009, and 034*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Krauss, B., and W.P. Alexander
1984 *Grove Farm Plantation: The Biography of a Hawaiian Sugar Plantation*. Pacific Books, Palo Alto.
Krauss, B.H.
1993 *Plants in Hawaiian Culture*. University of Hawaiʻi Press, Honolulu.

Landrum, J.
1984 *An Archaeological Reconnaissance of the U.S Coast Guard Harbor Range Lights Facility, TMK (2) 5-3-01:3, Kaunakakai, Molokaʻi*. Bishop Museum, Honolulu.
Lee, M.K.
2012 Interview. *"The Royal Bones of ʻEwa – A Visit with Michael Kumukauoha Lee."* The Free Hawaiʻi Broadcasting Network, January 28, 2012. Video. https://www.youtube.com/watch?v=M6uMqAlLPrE, accessed August 8, 2025.
2013 *"West Oahu's Limu – Where Did It All Go?"* Pākē Salmon, January 11, 2013.
Lee-Greig, T.L.
2018 *Cultural Impact Assessment for the Proposed Molokai Public Library Meeting Room Addition*. ʻĀina Archaeology, Kīhei.
Lee-Greig, T.L., K.M. Folio, and H.H. Hammatt
2016 *Archaeological Inventory Survey Report for the Kaunakakai Drainage System "B" Improvements Project, Kaunakakai Ahupuaʻa, Molokaʻi District, Molokaʻi Island, TMKs: [2] 5-3-001:003 & 008 and 5-3-005:006 & 007*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Lee-Greig, T.L., and H.H. Hammatt
2013 *Supplemental Archaeological Inventory Survey (AIS) Conducted for the Proposed Phase II Expansion of the Four Seasons Resort at Mānele Bay, Pālāwai Ahupuaʻa, Lāhainā District, Lānaʻi Island TMK: (2) 4-9-017:001,002, 007.* Cultural Surveys Hawaiʻi, Inc., Wailuku.
Lewis, E.
1970 *The Campbell Project: A Preliminary Report*. University of Hawaiʻi, Honolulu.
Longman, R.J., M.P. Lucas, J. Mclean, et al.
2024 *"Hawaiʻi Climate Data Portal (HCDP)."* Bulletin of the American Meteorological Society.
Macdonald, G.A., A.T. Abbott, and F.L. Peterson
1983 *Volcanoes in the Sea*. Second Edition. University of Hawaiʻi Press, Honolulu.
Madeus, J.K., and H.H. Hammatt
2010 *An Archaeological Monitoring Report for the Kaunakakai Elementary School Grease Interceptor and Four Inch Sewer Line Installation and Replacement Project, Kaunakakai Ahupuaʻa, Kona District, Molokaʻi Island (TMK [2} 5-3-002:052)*. Cultural Surveys Hawaiʻi, Inc., Wailuku.
Malden, C.R.
1825 *Sandwich Islands, South Coast of Oahu. Registered Map 0640*. On file at Hawaii Land Survey Division, Department of Accounting and General Services, Honolulu.
Maly, K.
1996 *Historical Documentary Research and Oral History Interviews: Waiākea Cane Lots (12, 13, 17, 18, 19, 20 & 20A), Ahupuaʻa of Waiākea, District of South Hilo, Island of Hawaiʻi (TMK:2-4-01,7,10)*. Kumu Pono Associates, Hilo.
1999 *The Historic Puna Trail – Old Government Road (Keaʻau Section): Archival-Historical Documentary Research, Oral History and Consultation Study, and Limited Site Preservation Plan*. Kumu Pono Associates, Hilo.
2013 *He Moʻolelo No Pālawāi A Me Kamaʻo Ma Lānaʻi A Kaululāʻau (A History of Pālāwai and Kamaʻo on Lānaʻi of Kaululāʻau)*. Kumu Pono Associates, Hilo.
2014 *A Field Guide to Lānaʻi's Storied Places, People, Resources, and Historic Events (December 2014 v. 2)*. Kumu Pono Associates, Hilo.
2020 *Mānele Small Boat Harbor Archaeological-Ethnographic Study Synthesis (Draft)*. Kumu Pono Associates, Hilo.
2022 *Honouliuli~ He Ala Mēheuheu A Nā Hānauna (A Customary Path Traveled Over The Generations)*. Kumu Pono Associates, Hilo.

Maly, K., and O. Maly
2003a *He Wahi Moʻolelo No Ponahawai a Me Punahoa Ma Hilo: A Collection of Traditions and Historical Accounts for Ponahawai and Punahoa, District of Hilo, Island of Hawaiʻi (TMK 2-3-44:19; 2-3-49:53; 2-3-37:01)*. Kumu Pono Associates, Hilo.
2003b *Volume I: Ka Hana Lawaiʻa a Me Nā Koʻa O Na Kai ʻEwalu. A History of Fishing Practices and Marine Fisheries of the Hawaiian Islands. Kumu Pono Associates, Hilo*.
2012 *He Moʻolelo ʻĀina– Traditions And Storied Places In The District Of ʻEwa And Moanalua (In The District Of Kona), Island Of Oʻahu A Traditional Cultural Properties Study – Technical Report*. Kumu Pono Associates, Hilo.
2014 *He Moʻolelo ʻĀina: Traditions and Storied Places of Honouliuli, District of ʻEwa, Island of Oʻahu*. Kumu Pono Associates, Hilo.
2022 *A History of the Hilo Yacht Club: Traditions and Historical Accounts of Waiākea, Makaokū, Honohononui, and Neighboring Lands on the Island of Hawaiʻi. Hilo: Hilo Yacht Club*. Hilo Yacht Club, Hilo.

Maly, K., A.T. Walker, and P.H. Rosendahl
1994 *Archaeological Inventory Survey, Waiākea Cane Lots, Portion of Parcel 6, Land of Waiākea, South Hilo District, Island of Hawaiʻi (TMK:2-4-57:01)*. Paul H. Rosendahl, Ph.D., Inc., Hilo.

Mason Architects, Inc.
2003 *Historic Resources Survey, Evaluation, and Impact Assessment of Kapa'a Relief Route Kuhio Highway Corridor Improvements Project Hanama'ulu to Kapa'a*. Mason Architects, Inc., Honolulu.
2020 *Historic Context and Building Inventory Of World War II Era Aircraft Revetments At Marine Corps Base Hawaii, Kaneohe Bay, Marine Corps Training Area Bellows, and Kalaeloa-U.S. Navy Retained Lands, Oahu Hawaii*. Mason Architects, Inc., Honolulu.

Maui News
1900a *"A Model Camp."* The Maui News.
1900b *"Early History of Kahului."* The Maui News.
1900c *"No More Plague Cases."* The Maui News.
1900d Untitled. The Maui News.
1907 *"Lease Holders of Kahului Meet."* The Maui News.

McAllister, J.G.
1933 *Archaeology of Oʻahu*. Bulletin 104. Bishop Museum, Honolulu.

McCoy, P., and S.D. Clark
2008 *Final Report Archaeological and Cultural Impact Assessments for the Proposed H-POWER Expansion Project, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu TMK: (1) 9-1-026:30, 33, and 34*. Pacific Consulting Services, Inc., Honolulu.

McElroy, W.K., and M. Elison
2014 *Archaeological Monitoring Report for Kaunakakai Wharf Improvements, Kaunakakai Ahupuaʻa, Kona District, Island of Molokaʻi TMK: (2) 5-3-001:005 and :011*. Keala Pono, LLC, Kaneohe.

McElroy, W.K., M. Elison, and R. Kapoi-Keliʻi
2013 *Archaeological Assessment for Improvements to Duke Maliu Regional Park, Kaunakakai Ahupua'a, Kona District, Island of Moloka'i*. Keala Pono, LLC, Kaneohe.

McElroy, W.K., M. Elison, and D. Duhaylonson
2015 *Cultural Impact Assessment for Redevelopment of the Kalaeloa Barbers Point Harbor Fuel Pier in Kalaeloa, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu*. Keala Pono Archaeological Consulting, LLC.

McElroy, W.K., and S. Eminger
2015a *Archaeological Inventory Survey for Flood Control Levees in Kaunakakai Ahupuaʻa, Kona District, Island of Molokaʻi, Hawaiʻi TMK: (2) 5-3-005:006 (Por.), :008 (Por.) and :010 (Por.), (2) 5-3-003:015 (Por.), (2) 5-3-002:022 (Por.) and :024 (Por.)*. Keala Pono, LLC, Kaneohe.
2015b *Archaeological Monitoring Report for Flood Control Levee Borings in Kaunakakai Ahupuaʻa, Kona District, Island of Molokaʻi Hawaiʻi*. Keala Pono, LLC, Kaneohe.
McElroy, W.K., M. Pinsonneault, and L. Medina
2024 *FINAL—Archaeological Inventory Survey for the Kahului Civic Center Mixed-Use Complex Project, Wailuku Ahupuaʻa, Wailuku District, Island of Maui, Hawaiʻi, TMK: (2) 3-7-004:003 (Por.)*. Keala Pono Archaeological Consulting, LLC, Kāneʻohe.
McGerty, L., and M.T. Carson
1999 *An Archaeological Inventory Survey Within a Portion of Drainage System A, Kaunakakai, Island of Molokaʻi, Hawaiʻi (TMK 5-03-02: 72; 5-3-63: 01; 5-3-09:17)*. Scientific Consultant Services, Inc., Honolulu.
McGerty, L., and R.L. Spear
1999 *An Inventory Survey of an Additional Unsurveyed Portion of TMK: 2-4-57:1, Land of Waiākea, South Hilo District, Island of Hawaiʻi*. Scientific Consultant Services, Inc., Honolulu.
2006 *An Archaeological Assessment Report for an Approximately 5-Acre Parcel in Kaunakakai Ahupuaʻa, Molokaʻi Island, Hawaiʻi [TMK: 5-03-003: Par. 15]*. Scientific Consultant Services, Inc., Honolulu.
McGuire, K., and H.H. Hammatt
2000 *Archaeological Monitoring Report for the Kaunakakai Drainage System "A", Kaunakakai Molokai (TMK 5-3-2: Por. 72; 5-3-3: Por. 1; 5-3-5: Por. 8, 5-3-9: Por. 7, Por. 17, Por. 18. Por.22)*. Cultural Surveys Hawaiʻi, Inc., Kailua.
McIntosh, J.D., C.C. Fechner, and P.L. Cleghorn
2020 *Archaeological Inventory Survey for the Proposed Improvements to the Department of Hawaiian Home Lands Water System on Molokaʻi Lands in Pālāʻau, Hoʻolehua, Nāʻiwa, Kahanui, and Kalamaʻula Ahupuaʻa Kona District, Island of Molokaʻi [TMK (2) 5-2-002:999; (2) 5-2-005:999; (2) 5-2-006:999; (2) 5-2-007:029, 030, 035, 039, 040, 055, 076-080, 082-085, 090, 999; (2) 5-2-008:001, 002, 004-006, 029, 043, 044, 046, 079, 084, 086, 091, 099, 102, 122, 123, 999; (2) 5-2-009:012, 016, 018, 026, 999; (2) 5-2-010:001-004, 007; (2) 5-2-012:034, 035, 999; (2) 5-2-013:010, 020, 021; (2) 5-2-021:999; (2) 5-2-023:009; (2) 5-2-024:999; (2) 5-2-025:999; (2) 5-2-032:068, 070; and (2) 5-2-033:047-053, 058, 061]*. Pacific Legacy, Inc., Kailua.
McMahon, N., and W. Tolleson
2015 *An Archaeological Assessment with Subsurface Testing of the Proposed Kauai Philippine Cultural Center Ahupuaʻa of Nāwiliwili, Moku of Līhuʻe, Island of Kauaʻi, TMK: (4) 3-3-003: 043*. Exploration Associates, LTD, Lihue.
M&E Pacific, Inc.
1980 *Revised Environmental Impact Statement for the Hilo Wastewater Management Plan of the Hilo District, South Hilo, Hawaii*. M&E Pacific, Inc., Honolulu.
1988 *Final Environmental Assessment for the Old Hilo Wastewater Treatment Plant Conversion, Kalanianaole Avenue and Pua Avenue, Hilo, Hawaii*. M&E Pacific, Inc., Honolulu.
Medina, L., and H.H. Hammatt
2015 *Archaeological Monitoring Report for the Hanua Street Containment Cap and Barrier Project, James Campbell Industrial Park, 91-008 Hanua Street, Kapolei, Honouliuli Ahupuaa, Ewa District, Oahu TMK: (1) 9-1-026:026*. Cultural Surveys Hawaiʻi, Inc., Kailua.

Medrano, S., and M.F. Dega
2013 *An Archaeological Monitoring Report for the Duke Maliu Regional Park Project Kaunakakai Ahupuaʻa, Kona District Molokaʻi Island, Hawaiʻi (TMK 5-3-003:012)*. Scientific Consultant Services, Inc., Honolulu.
Menzies, A.
1920 *Hawaii Nei 128 Years Ago*. New Freedom Press, Honolulu.
Molokai Education Center- The College on Molokai
n.d. *Molokai Education Center History*. *University of Hawaiʻi Website*. https://www.hawaii.edu/molokai/history.htm#:~:text=Maui%20Community%20College%20first%20offered,for%20the%20College%20on%20Molokai, accessed August 11, 2025.
Monahan, C.M.
2020 *National Register of Historic Places Registration Form 10-900 for Puʻu o Kapolei.*
Monahan, C.M., and J. Powell
2005 *An Archaeological Monitoring Report During Phase II of the Kauaʻi Rural Fiber Optic Duct Lines Project, Kauaʻi Island, Hawaiʻi [TMK: (4) 1, 2, 3]*. Scientific Consultant Services, Inc., Honolulu.
Monsarrat, M.D.
1878 *Map of Honouliuli Taro Land. Registered Map 0630*. On file at Hawaiʻi Land Survey Division, Department of Accounting and General Servic, Honolulu.
1881 *Coast of Oahu, from Windmill at Puuloa to Waimanalo. Registered Map 0896*. On file at Hawaiʻi Land Survey Division, Department of Accounting and General Servic, Honolulu.
1886 *Molokai, Portion of Middle and West Section (Registered Map 1288 Tracing)*.
Moriki, D.
2014 *"History Says Dairy Farms Once Common."* The Garden Island, Līhuʻe.
Morrison, B.
1993 *Kilohana National Register of Historic Places Inventory Nomination Form*. Boone Morrison Architects, Inc., Volcano.
Moy, T.
1993 *National Register of Historic Places Registration Form: Molokai Public Library*. Hawai'i State Historic Preservation Division, Honolulu.
Muise, K.E., and R.B. Rechtman
2008 *Archaeological Monitoring Report for the Marine Landing and Kalamaula to Alii Fishpond Terrestrial Sections of Sandwich Isles Communications, Inc.'s Molokai Rural Fiber Optics Duct Lines Project*. Rechtman Consulting, LLC, Hilo.
Mulrooney, M., and K. Pacubas
2021 *Cultural Impact Assessment of the Barbers Point Solar Project, Honouliuli Ahupuaʻa, ʻEwa District, Island of Oʻahu*. Pacific Legacy, Inc., Kailua.
National Register of Historic Places
2024 *National Register Database and Research. Light Stations of the United States MPS. Barbers Point Light, Reference Number: 100010117*. National Register of Historic Places. https://www.nps.gov/subjects/nationalregister/database-research.htm#table.
Native Plants Hawaiʻi
2009 *Melicope Anisata*. *Native Plants*. http://nativeplants.hawaii.edu/plant/view/Melicope_anisata/, accessed August 13, 2025.
Ne, H.
1992 *Tales of Molokai: The Voice of Harriet Ne*. Institute for Polynesian Studies, Lāʻie.

Neller, E., and S. Palama
1973 *The Archaeology of Puna, Kauaʻi From the Ahupuaʻa of Niumalu to the Ahupuaʻa of Kipu, Archaeological Reconnaissance of the Hulēʻia River Valley Area*. Archaeological Research Center Hawaii, Lāwaʻi.
Nelson, J.D., T. Gotay, and R.B. Rechtman
2017 *Archaeological Monitoring Report for Kapiʻolani Street Extension Project TMKs: (3) 2-4-001:019 (Por.), 024 (Por.), 120 (Por.), 167 (Por.), 179 (Por.), 181,182, and 183 (Por.); (3) 2-4-023: 022 (Por.) and 023 (Por.); (3) 2-4-028:014 (Por.) and 032 (Por.); (3) 2-4-056:014 (Por.), 015 (Por.), 021 (Por.), 022 (Por.), 028 (Por.), 029, and 030 (Por.); and (3) 2-4-057:024 (Por.) Waiakea Ahupuaʻa South Hilo District Island of Hawaii*. ASM Affiliates, Hilo.
Neves, P.
1992 *National Register of Historic Places Inventory Nomination Form Kamehameha Hall*. Hawaii Register of Historic Places.
Nogelmeier, M.P.
2006 *The Epic Tale of Hiʻiakaikapoliopele: Woman of the Sunrise, Lighting-Skirted Beauty of Halemaʻumaʻu*. Awaiaulu, Honolulu.
Office of Environmental Quality Control
1997 *"Guidelines for Assessing Cultural Impacts."* The Environmental Council, State of Hawaii.
Office of Hawaiian Affairs
2025 *Kīpuka Database*. Electronic database. https://kipukadatabase.com/kipuka/.
Okuma, C.K.
2016 *Cultural Impact Assessment Interview Summaries Appendix L, Proposed Modified Kaunakakai Drainage System Improvements (Phase IB)*. Munekiyo Hiraga, Wailuku.
Pacific Commercial Advertiser
1861 *"More about the Mormons, Letter from Capt. Walter M. Gibson."* Pacific Commercial Advertiser, October 24.
1881a *"Lajos, An Original Story of Hungary and the Hawaiian Islands, Part VII. Calypso Holds Telemachus."* Pacific Commercial Advertiser, April 30.
1881b *"Lajos, An Original Story of Hungary and the Hawaiian Islands, Part IX. The Meeting."* Pacific Commercial Advertiser, May 14.
1900 *"Plague on Maui."* Pacific Commercial Advertiser.
Pactol, C.C.
2012 *"Centuries of Molokai Paʻakai. Salt: A Long History of High Value."* The Molokai DIspatch.
Palama, S.L.
1973 *An Archaeological Reconnaissance of a Portion of the New Kauaʻi Community College at Puhi, Haʻiku Ahupuaʻa, Island of Kauaʻi. Project 14-16.* Archaeological Research Center Hawaiʻi, Lāwaʻi.
Pele Defense Fund v. Paty, 73 Hawaiʻi 578, 837 P.2d 1247 (Haw. 1992)
Penkiunas, D.
1992 *National Register of Historic Places Registration Form 10-900 for Henry Perrine Baldwin High School.* Hawaii Register of Historic Places.
Perzinski, D., and M.F. Dega
2011 *An Archaeological Monitoring Report for the County Cesspool Replacement Project at the War Memorial Park and Baseball Field Complex in Wailuku, Wailuku Ahupuaʻa, Wailuku District, Maui Island, Hawaiʻi [TMK (2) 3-08-07:055 Por.]*. Scientific Consultant Services, Inc., Honolulu.

Perzinski, D., J. Winieski, and H.H. Hammatt
2001 Archaeological Monitoring Report for Soil Testing Associated with a Proposed Waterline Replacement Project in Paukukalo, Wailuku Ahupuaʻa on Kainalu, Kaikoo, and Ukali Streets, and Lipo, Lilihua, and Kanai Places, Island of Maui (TMK 3-4-27, 29, 29). Cultural Surveys Hawaiʻi, Inc., Kailua.
PHRI (Paul H. Rosendahl, Ph.D., Inc.)
2001 *Cultural Impact Assessment Study Ocean Bay Plantation at Hanamāʻulu, Land of Hanamāʻulu, Lihuʻe District, Island of Kauaʻi (TMK:4-3-7-3:1; 4-3-9-5:5).* Paul H. Rosendahl, Ph.D., Inc., Hilo.
Public Access Shoreline v. Hawaiʻi County Planning Commission, 79 Hawaiʻi 425, 903 P.2d 1246 (Haw. 1995)
Pukui, M.K.
1983 *ʻŌlelo Noʻeau: Hawaiian Proverbs & Poetical Sayings*. Bishop Museum Press, Honolulu.
1994 *The Water of Kāne and Other Legends of the Hawaiian Islands*. Kamehameha Schools Press, Honolulu.
Pukui, M.K., and S.H. Elbert
1986 *Hawaiian Dictionary*. Revised Edition. University of Hawaiʻi Press, Honolulu.
Pukui, M.K., S.H. Elbert, and E.T. Mookini
1974 *Place Names of Hawaii*. Revised Edition. University of Hawaiʻi Press, Honolulu.
Pukui, M.K., and L.C.S. Green
1995 *Folktales of Hawaiʻi (He Mau Kaʻao Hawaiʻi)*. Bishop Museum Special Publication 87, Honolulu.
Ramsay, R.A.
1960 *The Kahului Railroad*. 102. The Railway and Locomotive Historical Society Bulletin.
1969 *Kahului Railroad – The Final Chapter*. 120. The Railway and Locomotive Historical Society Bulletin.
Rechtman, R.B.
2000 *Archaeological Monitoring for the Lower Main Street Jack in the Box Restaurant Land of Wailuku, Wailuku District Island of Maui (TMK: 2-3-4-043:01,02)*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
2009 *Archaeological Assessment Survey for the Proposed Hilo Bayfront Trails Project, Piʻihonua, Punahoa, Pōnāhawai, Kūkūau, and Waiākea Ahupuaʻa, South Hilo District, Island of Hawaiʻi*. Rechtman Consulting, LLC, Hilo.
Rechtman, R.B., and J.D. Henry
1998 *University of Hawaiʻi-Hilo Kāwili Street Development Archaeological Inventory Survey (TMK: 3-2-4-01:5), Waiākea Ahupuaʻa, South Hilo District, Island of Hawaiʻi*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
Resnick, B., L. Frye, and E. Salo
2018 *Ewa Field South Revetment Historic District National Register of Historic Places Inventory/Nomination Form; TMK: (1) 9-1-013-095*. GAI Consultants, Homestead.
Rice, W.H.
1923 *Hawaiian Legends*. Bishop Museum Press, Honolulu.
Riznik, B.
1999 *From Barracks to Family Homes: A Social History of Labor Housing Reform on Hawaiʻi's Sugar Plantations*. The Hawaiian Journal of History. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://evols.library.manoa.hawaii.edu/server/api/core/bitstreams/3f1ead62-199a-4fc1-b25a-fab11d29c776/content, accessed August 20, 2025.

Robins, J.J., and R.L. Spear
1996 *An Inventory Survey of the Puanaiko Street Realignment/Extension Project Expanded Corridor, Waiakea, Kukuau 1–2, and Ponahawai, South Hilo District, Island of Hawaii*. Scientific Consultant Services, Inc., Honolulu.
Rosendahl, M.L.K.
1988 *Archaeological Reconnaissance Survey for Environmental Impact Statement (EIS) Hilo Wastewater Treatment Facility Site, Land of Waiakea, District of South Hilo, Island of Hawaii (TMK: 2-1-13: Por. 12, 13, 20, 22)*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
Rosendahl, P.H.
1989 *Addendum Report: Archaeological Inventory Survey of Eight Additional Areas Grove Farm Lihu'e/Puhi Project Area*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
2001 *Cultural Impact Assessment Study Ocean Bay Plantation at Hanamā'ulu, Land of Hanamā'ulu, Līhu'e District, Island of Kaua'i (TMK:4-3-7-3:1;4-3-9-5:5) Technical Report for Environmental Impact Statement.* Paul H. Rosendahl, Ph.D., Inc., Hilo.
Royalty, Z.D., and H.H. Hammatt
2017 *Archaeological Monitoring Report for the Main Street and Ka'ahumanu Avenue Resurfacing Project from High Street to Hobron Avenue Wailuku Ahupua'a, Wailuku District, Maui Island TMK(s): [2] 3-4-001, 011, 012, 013, 018, and 042, [2] 3-7-002, 003, 004, 008, 010, and 011, and [2] 3-8-007 and 046, Ka'ahumanu Avenue and Main Street ROWs*. Cultural Surveys Hawai'i, Inc., Kailua.
Runyon, R., H.H. Hammatt, and D.W. Shideler
2012 *Draft Archaeological Assessment for a Chevron Products Company, Solar Site at James Campbell Industrial Park, Honouliuli Ahupua'a, 'Ewa District, Island of O'ahu [TMK: (1) 9-1-031:002 Por.]*. Cultural Surveys Hawai'i, Inc., Kailua.
Saito, D., and S. Campbell
1987 *Register of the Lihue Plantation Company*. Hawaiian Sugar Planters' Association Plantation Archives. https://www2.hawaii.edu/~speccoll/p_lihue.html, accessed August 14, 2025.
Sato, H.H., W. Ikeda, R. Paeth, R. Smythe, and M. Takehiro Jr.
1973 *Soil Survey of the Island of Hawaii, State of Hawaii*. United States Department of Agriculture, Soil Conservation Service, Washington D.C.
Schilz, A.J., and J. Landrum
1996 *Archaeological Test Excavations at the Shipboard Electronic Systems Evaluation Facility (SESEF) Shorebased Site, MILCON P-369 U.S. Coast Guard Station, Barbers Point, 'Ewa District, O'ahu, Hawai'i (TMK 9-1-26-2)*. Ogden Environmental, Honolulu.
Schleck, R.J., and N.E. Napoka
1979 *National Register of Historical Places Inventory Nomination Form Grove Farm Company Locomotives*. Grove Farm Homestead, Lihue.
Schmitt, R.C.
1973 *The Missionary Censuses of Hawaii*. Department of Anthropology, Bernice P. Bishop Museum, Honolulu.
Shun, K.
1982 *Archaeological Reconnaissance Survey and Test Excavations of the Wastewater Treatment Facility Area, Kaunakakai, Molokai TMK 5-3-05:2*. Bishop Museum, Honolulu.
Sinoto, A.
1978 *Cultural Reconnaissance of Manele Bay Dredged Material Disposal Site, Palawai, Island of Lanai, Hawaii. Manuscript. No. 051578*. Bishop Museum, Honolulu.
Smith, D.
2004 *"Aquaculture Center Work Begins."* Hawaii Tribune-Herald.

Smith, J.G.
1941 *"Waiakea Mill Has Had Long, Stormy Career."* Honolulu Advertiser.
Snow, E.R.
1884 Biography and Family Record of Lorenzo Snow: One of the Twelve Apostles of the Church of Jesus Christ of Latter-Day Saints. Deseret News Company, Salt Lake.
Soboleski, H.
2018 *The Wailua Fairgrounds and Race Track*. *The Garden Island*. https://www.thegardenisland.com/2018/04/01/lifestyles/the-wailua-fairgrounds-and-race-track/, accessed August 20, 2025.
2025 *George Norton Wilcox: Sugar Pioneer and Philanthropist*. *Grove Farm*. https://www.grovefarm.com/sustainability/sustainable-culture/stories/george-norton-wilcox-sugar-pioneer-and-philanthropist, accessed August 20, 2025.
Soehren, L.
1964 *Report on Fieldtrip to Manele Bay, Lanai*. Bishop Museum, Honolulu.
2019 *A Catalog of Hawaiian Place Names, Compiled from the Records and Boundary Commission and The Board of Commissioners to Quiet Land Titles of the Kingdom of Hawaii. Ulukau: The Hawaiian Electronic Library*. ulukau.org, accessed August 11, 2025.
Soltz, A., D.W. Shideler, and H.H. Hammatt
2014 *Archaeological Inventory Survey for the Kauai Beach Resort Overflow Parking Project Hanamā'ulu Ahupua'a, Līhu'e District, Kaua'i TMK: [4] 3-7-003: 017 Por*. Cultural Surveys Hawai'i, Inc., Kailua.
Spangler, G.S., S.A. Belluomini, and H.H. Hammatt
2020 *Archaeological Monitoring Report for the Kapolei Corporation Yard, Kalaeloa, Honouliuli Ahupua'a, 'Ewa District, O'ahu TMK: [1] 9-1-026:004*. Cultural Surveys Hawai'i, Inc., Kailua.
Speakman, C.E.
1978 *Mowee: An Informal History of the Hawaiian Island*. Peabody Museum of Salem, Salem.
Spear, R.L.
1995 *Data Recovery Excavations for Sites 50-10-35-19431, 19432, 19433, and 19434, Land of Waiakea, South Hilo District, Island of Hawai'i [TMK:2-4-57:01]*. Scientific Consultant Services, Inc., Honolulu.
Sprouse, K.M., T.L. Lee-Greig, and H.H. Hammatt
2013 *An Archaeological Monitoring Report for the DAGS/ICSO Infrastructure Project at the Kaunakakai Civic Center, Kaunakakai Ahupua'a, Moloka'i District, Moloka'i Island, [TMK: (2) 5-3-005: 010, 012, 013, & 014)*. Cultural Surveys Hawai'i, Inc., Wailuku.
Sterling, E.P.
1998 *Sites of Maui*. Bishop Museum Press, Honolulu.
Sterling, E.P., and C.C. Summers
1978 *Sites of O'ahu*. Bishop Museum Press, Honolulu.
Stine, C., D. Shideler, and H.H. Hammatt
2014 *Archaeological Monitoring Report for the Molokai Hazmat Project for Kaunakakai Harbor Ferry System Improvements Kaunakakai Ahupua'a, Molokai, Hawai'i TMK [2] 5-3-001 (Various Parcels)*. Cultural Surveys Hawai'i, Inc., Kailua.
Stokes, J.F.G.
1909 *Heiaus of Molokai. Molokai Survey Field Note Book. Manuscript.* Bishop Museum, Honolulu.
1991 *Heiau of the Island of Hawai'i: A Historic Survey of Native Hawaiian Temple Sites*. Bishop Museum Press, Honolulu.

Summers, C.
1964 *Hawaiian Fishponds*. Bishop Museum Special Publication 52. Bishop Museum Press, Honolulu.
1971 *Molokaʻi: A Site Survey*. Pacific Anthropological Records No. 14. Bishop Museum, Honolulu.
Sustʻāinable Molokai
2024 *Molokaʻi Climate Change and Sea Level Rise Adaptation and Resiliency (CCSLAR) Plan*. Sustʻāinable Molokai, Kaunakakai.
Swift, J.A., and M.A. Mulrooney
2022 *Addendum Update to the 2008 Cultural Impact Assessment and Ka Paʻakai O Ka ʻĀina Analysis for the Proposed Makakilo Quarry Expansion, Honouliuli Ahupuaʻa, Kapolei, ʻEwa Moku, Island of Oʻahu [Tmk: (1) 9-2-003:074 (Por.)]*. Pacific Legacy, Inc., Kailua.
Tanaka, K., and H.H. Hammatt
2020 *Cultural Impact Assessment for the Hawaiian Cement Relocation at Kahului Harbor Project, Wailuku Ahupuaʻa, Wailuku District, Maui Island, TMKs: [2] 3-7-010:003, 009, and 034*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Tanaka, K., D. Shideler, and H.H. Hammatt
2024 *Ka Paʻakai Analysis for the Kunia Village New Source Well Project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu TMK: (1) 9-2-005:023 Por*. Cultural Surveys Hawai'i, Inc., Kailua.
TenBruggencate, J.
1982 *"Nukolii: Work on Site Halts – Debate Goes On."* Honolulu Advertiser.
Tetra Tech
2025a *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - Kaua'i Cable Landing Site*. Tetra Tech, Honolulu.
2025b *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - O'ahu Cable Landing Site*. Tetra Tech, Honolulu.
2025c *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - Maui Cable Landing Site*. Tetra Tech, Honolulu.
2025d *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - Molokai Cable Landing Site*. Tetra Tech, Honolulu.
2025e *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - Lānaʻi Cable Landing Site*. Tetra Tech, Honolulu.
2025f *Biological Resources Survey Report. Hawaiian Islands Fiber Link Project - Hawaiʻi Island Cable Landing Site*. Tetra Tech, Honolulu.
Thrum, T.G.
1886 *"Great Land Colonization Scheme."* Hawaiian Almanac and Annual for 1886. Honolulu.
1887 *"Retrospect For The Year 1887."* Hawaiian Almanac and Annual for 1888. Honolulu.
1890 *"A Brief History of Land Titles in the Hawaiian Kingdom."* Hawaiian Almanac and Annual for 1891. Honolulu.
1901 *"Aiai, Son of Ku-Ula."* Hawaiian Almanac and Annual for 1902. Honolulu.
1907 *"Heiaus and Heiau Sites throughout the Hawaiian Islands."* Hawaiian Almanac and Annual 10 for 1907:36–48. Thos. G. Thrum, Honolulu.
1908 *Hawaiian Almanac and Annual for 1908: The Reference Book of Information and Statistics Relating to the Territory of Hawaii, of Value to Merchants, Tourists and Others*. Thos. G. Thrum, Honolulu.
1920 *"Story of the Race of People Called the Menehunes, of Kauai. (A Hawaiian Tradition.)." The Journal of the Polynesian Society* 29(114): 70–75.
1923 *"Plantation Matters."* Hawaiian Almanac and Annual for 1924. Honolulu.

Titchenal, P.
1998 *Archaeological Monitoring of Utility-Trench Excavations During Phase 1 Construction of Malama Cultural Park Kaunakakai, Molokaʻi (TMK 5-3-01: 02, Portion of 03, 05, 97, 99, 100)*. Aki Sinoto Consulting, Honolulu.
Titcomb, M., and M.K. Pukui
1972 *Native Use of Fish in Hawaii*. University of Hawaiʻi Press, Honolulu.
Tome, G., and M.F. Dega
2005 *An Archaeological Assessment of 0.76-Acres in Wailuku, Wailuku Ahupuaʻa, Wailuku District, Island of Maui, Hawaiʻi [TMK: 3-8-37:28].* Scientific Consultant Services, Inc., Honolulu.
Tomonari-Tuggle, M., D. Tuggle, and S. Athens
2000 *Archaeology on a South Coast Landscape: Hulopoʻe Lanai Volume I: Background, Summary, and Synthesis*. International Archaeological Research Institute, Inc., Honolulu.
Tracy, J.
1840 *History of American Missions to the Heathen, From Their Commencement to the Present Time*. Spooner & Howland, Worcester.
Truluck, A.F., and D. Ruzicka
2014 *Ewa Mooring Mast Field, National Register of Historic Places Inventory/Nomination Form.* MAI Consultants to Navel Facilities Engineering Command (NAVFAC).
Tuggle, H.D.
1993 *Malama Platform Archaeology: 1992 Excavations for Cultural Park Planning*. International Archaeological Research Institute, Inc., Honolulu.
Tuggle, H.D., and M.J. Tomonari-Tuggle
1997 *A Cultural Resource Inventory of Naval Air Station, Barbers Point, Oʻahu, Hawaiʻi: Part I: Phase I Survey and Inventory Summary*. International Archaeological Research Institute, Inc., Honolulu.
Turner, W.
1981 *Hawaiians Fight to Save Pristine Area*. *The New York Times*. https://www.nytimes.com/1981/04/29/us/hawaiians-fight-to-save-pristine-area.html.
Ulukau
2002 *Ulukau, the Hawaiian Electronic Library*. Online Database. (https://ulukau.org/index.php?l=en).
United States War Department
1913 Topographic Map of Oahu, U.S. Army Companies A, G, and I.
University of Hawaiʻi
2025 *Kauaʻi Community College: At a Glance*. https://www.hawaii.edu/campuses/kauai.
University of Hawaiʻi Maui College
2025 *University of Hawaiʻi Maui College Website*. https://maui.hawaii.edu/, accessed August 11, 2025.
Unknown
n.d *Central Hawaii Hilo and Hamakua. Registered Map 0571*. Available at the Hawaiʻi Land Survey Division, Department of Accounting and General Services, Honolulu.
n.d *Part of Waiakea Hilo Hawaii. Registered Map 0672*. Available at the Hawaiʻi Land Survey Division, Department of Accounting and General Services, Honolulu.
n.d *Map of Pālāwai. Registered Map 0506*. Available at the Hawaiʻi Land Survey Division, Department of Accounting and General Services, Honolulu.

U.S. Army Air Forces War Department
1941 *Lihue Dairy Field, Kauai, T.H. January, 27, 1941*. On file, U.S. National Archives and Records Administration.
U.S. National Archives and Records Administration
1931 *"Kaunakakai Landing, Molokai, T.H."* The American Landscape Collection: Historical Photograph Files, Photograph No. 23938395. Washington D.C.
1937 *"Barbers Point, Road West Side, Oahu, T.H."* The American Landscape Collection: Historical Photograph Files, Photograph No. 23938709. Washington D.C.
1941 *"Puupehe, Lanai, T.H."* The American Landscape Collection: Historical Photograph Files. Photograph No. 23938205. Washington D.C.
1943 *"Kaunakakai Molokai, T.H."* The American Landscape Collection: Historical Photograph Files, Photograph No. 23938393. Washington D.C.
n.d *"Kahalui Harbor from N.W."* The American Landscape Collection: Historical Photograph Files, Photograph No. 238303. Washington D.C.
ca. 1930s *"Lihue Dairy Landing Field, Kauai."* The American Landscape Collection: Historical Photograph Files. Photograph No. 68159549. Washington D.C.
U.S. Navy Hydrographic Office
1935 *Naval Air Pilot Pacific Islands. H.O. No. 184*. United States Government Printing Office, Washington.
USGS (United States Geological Survey)
1917 *Hilo Quadrangle*.
1923 *Island of Lanai*.
1927 *Kulani Quadrangle*.
1930 *Piihonua Quadrangle.*
1952 *Kaunakakai and Kamalo Quadrangles*.
1954 *Maui Hawaii Quadrangle*.
1955 *Wailuku Kamalo Quadrangle*.
1956 *Kulani Quadrangle*.
1963a *Kapaa Quadrangle*.
1963b *Lihue Quadrangle*.
1965 *Waialeale Quadrangle*.
Uyeoka, K.L., C. Monohan, K. Kaʻaikaula, K. Kupihea, M. Wheeler, and K. Kikiloi
2018 *Hālau O Puʻuloa, ʻEwa ʻĀina Inventory*. Nohopapa Hawaiʻi, LLC.
Van Dyke, J.M.
2007 *Who Owns the Crown Lands of Hawai'i*. University of Hawai'i Press, Honolulu.
Vancouver, G.
1798 *A Voyage of Discovery to the North Pacific Ocean, and Round the World; in Which the Coast of North-West America Has Been Carefully Examined and Accurately Surveyed. Undertaken by His Majesty's Command, Principally with a View to Ascertain the Existence of Any Navigable Communication between the North Pacific and North Atlantic Oceans; and Performed in the Years 1790, 1791, 1792, 1793, 1794, and 1795, in the Discovery Sloop of War, and Armed Tender Chatham, under the Command of Captain George Vancouver. Vol. 3, 3 Vols*. Printed for G.G. and J. Robinson [etc.], London.
Von Holt, I.E.K.
1985 *Stories of Long Ago: Niihau, Kauai, Oahu*. Daughters of Hawaii, Honolulu.
Wahl, M.
2021 *Honouliuli Ahupuaʻa: A History of the Largest Land Division on Hawai'i's Island of Oʻahu*. ArcGIS Story Map. https://storymaps.arcgis.com/stories/508c78cb5f5b4f6ba9846f62de0ec4db.

Walker, A.T., L. Kalima, and S.T. Goodfellow
1991 *Archaeological Inventory Survey, Lihu'e/Puhi/Hanamā'ulu Master Plan, Lands of Hanamā'ulu, Kalapaki, Nāwiliwili, Niumalu, and Wailua, Līhu'e District, Island of Kaua'i*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
Walker, A.T., and P. Rosendahl
1988 *Archaeological Surface and Subsurface Inventory Survey at a Grove Farm Līhu'e/Puhi Project Area*. Paul H. Rosendahl, Ph.D., Inc., Hilo.
Walker, W.M.
1931 *Archaeology of Maui. Unpublished Manuscript from the Bernice P. Museum*. Bishop Museum, Honolulu.
Wall, W.E.
1902 *Hilo City Section East of Waiakea River Showing Proposed Street System. Registered Map 2136*. Available at the Hawai'i Land Survey Division, Department of Accounting and General Services, Honolulu.
Weisler, M.
1989 *Archaeological Investigations of the Kaunakakai Field System, South-Central Moloka'i*. Archaeological Consulting and Research Services, Seattle.
Welch, D.J., A.A. Morgan, C.M. Magnuson, and U.K. Prasad
2004 *Archaeological and Cultural Impact Assessment of Cultural Resources at Kahului Harbor*. International Archaeological Research Institute, Inc., Honolulu.
Westervelt, W.D.
1915 *Legends of Old Honolulu*. Constable & Co, London.
Wichman, F.B.
1998 *Kaua'i: Ancient Place-Names and Their Stories*. University of Hawai'i Press, Honolulu.
Wickler, S.K., and H.D. Tuggle
1997 *A Cultural Resource Inventory of Naval Air Station, Barbers Point, O'ahu, Hawai'i; Part II: Phase II Inventory Survey of Selected Sites*. International Archaeological Research Institute, Inc.
Wilcox, C.
1996 *Sugar Water: Hawaii's Plantation Ditches*. University of Hawai'i Press, Honolulu.
Wilkes, C.
1845 *Narrative of the United States Exploring Expedition During the Years 1838, 1839, 1840, 1841, 1842*. C. Sherman, Philadelphia.
Wilkinson, S., A. Mitchell, and H.H. Hammatt
2010 *Archaeological Literature Review and Field Inspection for the Proposed Kumau Street Entrance Improvements, Pier 4, Hilo Harbor, Waiākea Ahupua'a, South Hilo District, Island of Hawai'i, TMK: (3) 2-1-007:999*. Cultural Surveys Hawai'i, Inc., Kailua.
Wilson Okamoto & Associates, Inc.
2002 *Cultural Impact Assessment: Hilo International Airport Proposed Improvements*. Wilson Okamoto & Associates, Inc., Honolulu.
Wolforth, T.R.
2004 *Inventory Survey for the Proposed Kūhio-Kalaniana'ole Park, Hilo: Investigations into the Kanakea Fishpond at Reed's Bay TMK:3-2-1-6:13 and 15*. Scientific Consultant Services, Inc., Honolulu.
2006 *Inventory Survey for the Mana Industrial Park Project: Investigations in the Pana'ewa Forest in Waiākea Ahupua'a, South Hilo District, Hawai'i Island TMK: (3) 2-1-012:4, 5, 6, 24 (Por.), 25, 26, 69 and 2-1-013:151*. Scientific Consultant Services, Inc., Honolulu.

Yorck, J., R. Chiogioji, and H.H. Hammatt
2004 *Archaeological Inventory Survey of the Approximately 34-Acre Radisson Kauaʻi Beach Resort Parcel at Hanamaʻulu Kauaʻi (TMK 3-7-03:7)*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Yucha, T.M., J.D. Starr, D.W. Shideler, and Hallett H Hammatt
2015 *Final Archaeological Assessment for the Honouliuli Wastewater Treatment Plant (WWTP) Secondary Treatment and Facilities Project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu, TMK: [1] 9-1-013:007*. Cultural Surveys Hawaiʻi, Inc., Kailua.
Ziegler, A.C.
2002 *Hawaii Natural History, Ecology, and Evolution*. University of Hawaiʻi Press, Honolulu.

APPENDIX A

Scoping and Community Outreach Letters
and Outreach Summaries for each Cable Landing Site

Scoping and Community Outreach letters for the overall project contained the following text:

> The State of Hawai‘i, represented by the University of Hawai‘i (UH) Vice President for Information Technology and Chief Information Officer, is proposing the Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system intended to improve and expand high-speed internet access (broadband) throughout the State of Hawai‘i. To assist with obtaining the necessary permits for the project, UH has engaged Ocean Networks Inc. (ONI), a private company specializing in the development, operation, and maintenance of submarine fiber optic cables.
>
> The HIFL Project involves construction, operation, and maintenance of an interisland subsea cable with cable landing sites located on Kaua‘i, O‘ahu, Maui, Molokai, Lāna‘i, and Hawai‘i Island. The subsea cable, which would be less than two inches in diameter, would be surface-laid on the seabed within State and U.S. Federal waters to interconnect the islands. At all six cable landing sites, horizontal directional drilling (HDD) would be used to install conduit to facilitate installation of the cable underneath the shoreline to an offshore punchout location in nearshore waters. Facilities on each island would include a beach manhole, terrestrial fiber optic cable, and a cable landing station with associated cable termination and monitoring equipment. Additional information regarding the project is attached to this letter; information is also available on the project website (https://www.hifl.llc/).
>
> Pacific Legacy, Inc. is conducting Cultural Impact Assessments (CIAs) and Ka Pa‘akai Analyses for the six proposed HIFL cable landing sites listed below. Consultation letters with information specific to each cable landing site are available on request.
>
> - Nukoli‘i Beach, Hanamā‘ulu and Niumalu Ahupua‘a, Līhu‘e District, Kaua‘i Island
> - Barbers Point Beach Park, Honouliuli Ahupua‘a, ‘Ewa Moku, O‘ahu Island
> - Kahului Harbor, Wailuku Ahupua‘a, Wailuku Moku, Maui Island
> - Molokai Yacht Club, Kaunakakai Ahupua‘a, Kona Moku, Molokai Island
> - Mānele Harbor, Pālāwai Ahupua‘a, Kona Moku, Lāna‘i Island
> - Pacific Aquaculture & Coastal Resource Center (PACRC), Hilo, Waiākea Ahupua‘a, South Hilo District, Hawai‘i Island
>
> The purpose of the CIA is to evaluate potential impacts to traditional cultural practices that may result from the proposed project, in accordance with the guidelines for assessing cultural impacts, which were adopted by the State of Hawai‘i Environmental Council on Nov. 19, 1997. For the CIA, the overall study area will be the respective ahupua‘a for each cable landing site, with a particular focus on the immediate surroundings of the project area.
>
> The CIA will also include a Ka Pa‘akai Analysis. The purpose of the Ka Pa‘akai Analysis is to assist the State of Hawai‘i in fulfilling its obligation to protect “all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua‘a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights” (Article XI, Section 7 of the Constitution of the State of Hawai‘i). It requires that the following specific findings and conclusions be addressed:
> (1) The identity and scope of valued cultural, historical, or natural resources within the project area, including the extent to which traditional and customary native Hawaiian rights are exercised;
> (2) The extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and
> (3) The feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist.

We are reaching out to you for this assessment because you have been identified as a source of knowledge for one or more of these study areas, or may have recommendations for other individuals that we should contact for this study. We are seeking your kōkua regarding any information related to the following components of our study:

-Cultural associations of these areas, such as moʻolelo or connections to legendary accounts.
-Knowledge of past and present land use within and near the project areas.
-Knowledge of past and present traditional gathering practices in these areas.
-Knowledge of cultural resources which may be impacted by the proposed project, including traditional resource gathering sites, traditional access trails, archaeological sites, historic sites, and burials.
-Any other cultural concerns that community members may have in relation to traditional - Hawaiian or other cultural practices within or near the proposed project areas.
-Referrals to other knowledgeable individuals who may be willing to share their cultural knowledge of the proposed project areas and wider ahupuaʻa.

Table 26. Outreach Summary for the Overall HIFL Project Area CIA and Ka Paʻakai Analysis

Name	Affiliation	Initial Contact Date	Comments
Cariann Ah Loo	Nakupuna Foundation	3/31/2025	No response received
Paula Akana	Friends of ʻIolani Palace	3/31/2025	No response received
E. Halealoha Ayau	Hui Iwi Kuamoʻo	3/31/2025	No response received
Paige Kapiolani Barber	Nanakuli Housing Corporation	3/31/2025	No response received
Aimee Elise Keliʻi Barnes	Hua Nani Impact	3/31/2025	No response received
Samson L. Brown	Au Puni O Hawaiʻi	3/31/2025	No response received
Jordan Kea Calpito	State Historic Preservation Division	4/7/2025 4/11/2025	No response received
ʻOlu Campbell	Hawaiʻi Land Trust	3/31/2025	No response received
Kevin Chang	Kuaʻāina Ulu ʻAuamo	3/31/2025	No response received
H. Kanoeokalani Cheek	Na Kuʻauhau ʻo Kahiwakaneikopolei	3/31/2025	No response received
Andrew Choy	Department of Hawaiian Home Lands	3/31/2025 4/7/2025	No response received
Abraham Cortes-Kaleopaa	Hawaiian Kingdom Task Force	3/31/2025	No response received
Roslyn Cummings	E Ola Kākou Hawaiʻi	3/31/2025	No response received
Jesse Cummings	Wai Koa Kauaʻi	3/31/2025	No response received
Mahealani Cypher	Koʻolau Foundation	3/31/2025	No response received
Leimana DaMate	Hawaii State Aha Moku Council	3/31/2025	No response received
Sheri-Ann Daniels	Papa Ola Lokahi	3/31/2025	No response received
Palikapu Dedman	Pele Defense Fund	3/31/2025	No response received
Kirk Deitschman	Ke Kula Nui O Waimānalo	3/31/2025	No response received
Nicole A. I. Dudoit	Alepa Hou Foundation	3/31/2025	No response received
Chelsie Evans	Hawaiian Community Assets, Inc.	3/31/2025	No response received
Elena Farden	Native Hawaiian Education Council	3/31/2025	No response received
Kiersten Faulkner	Historic Hawaiʻi Foundation	3/31/2025	No response received
Kamakana Ferreira	Office of Hawaiian Affairs	3/31/2025	No response received
Stacy Kealohalani Ferreira	Office of Hawaiian Affairs	3/31/2025	No response received
Amy Hanaialiʻi Gilliom	Hui O Waʻa Kaulua	3/31/2025	No response received
Noah Gomes	State Historic Preservation Division	3/31/2025 4/7/2025	No response received

Name	Affiliation	Initial Contact Date	Comments
Regina Hilo	State Historic Preservation Division	3/31/2025 4/7/2025	No response received
Kauanoe Hoʻomanawanui	State Historic Preservation Division	3/31/2025 4/7/2025	No response received
Kaweni Ibarra	Office of Hawaiian Affairs	3/31/2025	Request for draft of CIA and Ka Paakai Analysis for review; follow up questions
Brandi-Lynn Makalani Kupau Hyden	ʻApoākea Native Hawaiian Innovation Institute	3/31/2025	No response received
Lesley Iaukea	State Historic Preservation Division	3/31/2025	No response received
ʻĀnela Jackson	ʻAha Mālama, Corp.	3/31/2025	No response received
Bonnie Kahapea-Tanner	Kānehūnāmoku Voyaging Academy	3/31/2025	No response received
DreanaLee Kalili	Association of Hawaiian Civic Clubs	3/31/2025	No response received
DreanaLee Kalili	Imua Hawaii	3/31/2025	No response received
Naʻunanikinau Kamaliʻi	Kawaileo Law, A Limited Liability Law Company	3/31/2025	No response received
Shawn Kanaʻiaupuni	Partners in Development Foundation	3/31/2025	No response received
Donavan Kealoha	Purple Maiʻa Foundation	3/31/2025	No response received
Roxane Keliʻikipikāneokolohaka	Kiaʻi Kanaloa	3/31/2025	No response received
J. Kepoʻo Keliʻipaʻakaua	ʻOhana Keaweamahi	3/31/2025	No response received
Walter J. Kelly	Protect Keopuka Ohana	3/31/2025	No response received
Emma Emalia Keohokālole	ʻOhana Keohokālole	3/31/2025	No response received
Glen Kila	Koa Ike	3/31/2025	Provided feedback via email on 4/1/2025 for Oʻahu and Lānaʻi cable landing sites
Samuel Wilder King II	ʻAi Noa Foundation	3/31/2025	No response received
Leinoa Kong	State Historic Preservation Division	4/7/2025 4/11/2025	No response received
KipuKai Kualiʻi	Sovereign Council of Hawaiian Homestead Associations	3/31/2025	No response received
Manuel Kuloloio	Kuloloiʻa Lineage - I ke Kai ʻo Kuloloiʻa	3/31/2025	No response received
Leināʻala Kuloloio Vedder	Kuloloiʻa Lineage - I ke Kai ʻo Kuloloiʻa	3/31/2025	No response received
Cory K. Lehano	Nohona Health, Inc.	3/31/2025	No response received
Joseph Kūhiō Lewis	Council for Native Hawaiian Advancement	3/31/2025	No response received
Kainoa MacDonald	Association of Hawaiians for Homestead Lands	3/31/2025	No response received
Renson Madarang	Hale Mua Cultural Group	3/31/2025	No response received
Roz Kahalelehua Makāula	Nākiakaulani - Legal Group Kamehameha Schools	3/31/2025	No response received
Kuʻuleinani Maunupau	Native Hawaiian Philanthropy	3/31/2025	No response received
Kuʻupua Kiyuna Mossman	Department of Hawaiian Home Lands	3/31/2025	No response received

Name	Affiliation	Initial Contact Date	Comments
Brian Kaniela Naeʻole	Brian Kaniela Naeʻole Naauao	3/31/2025	No response received
Makalika Naholowaʻa	Native Hawaiian Legal Corporation	3/31/2025	No response received
Ikaika Nakahashi	State Historic Preservation Division	3/31/2025 4/7/25	Made referrals
Maraea K. Nekaifes	Nekaifes Ohana	3/31/2025	No response received
Kanoa Ng	Hui Mālama Ola Nā ʻŌiwi	3/31/2025	No response received
Carmela Leilani Noneza	Hanona Maui	3/31/2025	No response received
Carolyn Keala Norman	ʻOhana Keaweamahi	3/31/2025	No response received
Eugene O'Connell	The Makua Group	3/31/2025	No response received
	Ohana Waʻa	3/31/2025	No response received
Christophor Oliveira	Koa ʻIke Foundation	3/31/2025 4/4/2025	No response received
Landon Opunui	Nā Puʻuwai	3/31/2025	No response received
Kealana Phillips	State Historic Preservation Division	3/31/2025 4/7/2025	No response received
Kammy Purdy	Ahupuaʻa o Molokaʻi	3/31/2025	No response received
Lokoʻolu Quintero	The Hawaiian Church of Hawaiʻi Nei	3/31/2025	No response received
Dennis W. Ragsdale	Order of Kamehameha I	3/31/2025	No response received
William K. Richards Jr.	The Friends of Hokuleʻa and Hawaiʻiloa	3/31/2025	No response received
Walter Ritte	ʻĀina Momona	3/31/2025	Follow up questions, intends to submit comments as part of Section 106 consultation
Derek J. Sakaguchi	Native Hawaiian Community Development Corporation	3/31/2025	No response received
Adrian Nakea Silva	Hui Huliau Inc.	3/31/2025	No response received
Kaʻāhiki Solis	State Historic Preservation Division	3/31/2025 4/7/2025	No response received
Melvin Soong	The I Mua Group	3/31/2025	No response received
Laʻakea Suganuma	The Mary Kawena Pukūʻi Cultural Preservation Society	3/31/2025	No response received
Laʻakea Suganuma	Royal Hawaiian Academy of Traditional Arts	3/31/2025	Acknowledgement of receipt; sharing to other interested parties
Mililani Trask	Na Koa Ikaika Ka Lahui Hawaii	3/31/2025	No response received
Kelley Uyeoka	Nohopapa Hawaiʻi, LLC	3/31/2025	No response received
Trisha Kehaulani Watson	ʻĀina Momona	3/31/2025	No response received
Kali Watson	Department of Hawaiian Home Lands	3/31/2025	No response received
Trisha Kehaulani Watson-Sproat	Honua Consulting, LLC	3/31/2025	No response received
Trisha Kehaulani Watson-Sproat	Kalihi Palama Culture & Arts Society	3/31/2025	No response received
Taffi Wise	Kanu o ka ʻĀina Learning ʻOhana	3/31/2025	No response received

Scoping and Community Outreach letters for the Kauaʻi Cable Landing Site contained the following text:

> The State of Hawaiʻi, represented by the University of Hawaiʻi (UH) Vice President for Information Technology and Chief Information Officer, is proposing the Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system intended to improve and expand high-speed internet access (broadband) throughout the State of Hawaiʻi. To assist with obtaining the necessary permits for the project, UH has engaged Ocean Networks Inc. (ONI), a private company specializing in the development, operation, and maintenance of submarine fiber optic cables.
>
> The HIFL Project involves construction, operation, and maintenance of an interisland subsea cable with cable landing sites located on Kauaʻi, Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Island. The subsea cable, which would be less than two inches in diameter, would be surface-laid on the seabed within State and U.S. Federal waters to interconnect the islands. At all six cable landing sites, horizontal directional drilling (HDD) would be used to install conduit to facilitate installation of the cable underneath the shoreline to an offshore punchout location in nearshore waters. Facilities on each island would include a beach manhole, terrestrial fiber optic cable, and a cable landing station with associated cable termination and monitoring equipment. Additional information regarding the project is attached to this letter; information is also available on the project website (https://www.hifl.llc/).
>
> Pacific Legacy, Inc. is conducting Cultural Impact Assessments (CIAs) and Ka Paʻakai Analyses for the six proposed HIFL cable landing sites:
>
> - Nukoliʻi Beach, Hanamāʻulu and Niumalu Ahupuaʻa, Līhuʻe District, Kauaʻi Island
> - Barbers Point Beach Park, Honouliuli Ahupuaʻa, ʻEwa Moku, Oʻahu Island
> - Kahului Harbor, Wailuku Ahupuaʻa, Wailuku Moku, Maui Island
> - Molokai Yacht Club, Kaunakakai Ahupuaʻa, Kona Moku, Molokai Island
> - Mānele Harbor, Pālāwai Ahupuaʻa, Kona Moku, Lānaʻi Island
> - Pacific Aquaculture & Coastal Resource Center (PACRC), Hilo, Waiākea Ahupuaʻa, South Hilo District, Hawaiʻi Island
>
> This letter contains information specific to the cable landing site at Nukoliʻi Beach in Hanamāʻulu Ahupuaʻa and the cable landing station at the Kauaʻi Community College (KCC) campus in Niumalu Ahupuaʻa, though we would also welcome input or referrals for any of the HIFL cable landing sites listed above. Consultation letters with information specific to each cable landing site are available on request.
>
> The Nukoliʻi Beach Project Area
>
> The proposed cable landing site on the island of Kauaʻi is located at Nukoliʻi Beach, an undeveloped beach park accessed via Kauaʻi Beach Rd., just north of Hanamāʻulu (see attachment). This site would include a single HDD conduit, extending approximately 4,595 feet (1,400 m) from a beach manhole to the nearshore waters punchout point at a water depth of approximately 70 feet (18 m). The beach manhole and associated work areas would be sited in an undeveloped portion of the beach park, near the existing bathroom facilities. From the beach manhole, the terrestrial cable would be installed in new underground conduit along Kauaʻi Beach Road and Kauaʻi Beach Drive, terminating at a manhole at the intersection with Kūhiō Highway. From this point, the project would utilize fiber optic cable owned by a licensed utility as part of their existing utility network, generally following a route along Kūhiō Highway and Kaumualiʻi Highway to KCC. Space within an existing

building on the KCC campus would be used as the cable landing station. Trenching or similar ground disturbance may be required at KCC to deliver power to the cable landing station.

A desktop review was completed by Pacific Legacy to identify previously documented historic properties in the vicinity of proposed areas of ground disturbance for the project area. Previous studies identified three historic properties in or adjacent to the area of proposed ground disturbance near Nukoli‘i Beach (Figure, attached). A post-Contact drainage ditch (SIHP 50-30-08-02235) intersects the project area. At the southern end of the estimated extent of the ditch, outside of the project area, is a concrete bridge (SIHP 50-30-08-01846). Near the makai end of the project area is a complex of pre-Contact cultural deposits (SIHP 50-30-08-01838). Roughly 1,575 ft (480 m) north of the project area is a complex of dune burials (SIHP 50-30-08-00103). Previously identified historic properties near the area of proposed ground disturbance at the KCC campus are primarily post-Contact features associated with Lihue Plantation (SIHP 50-30-11-02179). Other historic properties in the vicinity (within a 0.5-mile radius) include the Wilcox Homestead (Kilohana; SIHP 50-30-11-09339), Grove Farm Company Locomotives (SIHP 50-30-11-09381), and the Puhi Camp Cemetery (SIHP 50-30-11-B006). Aside from the cemetery, no burials have been identified in the immediate vicinity of proposed ground disturbance at the KCC campus (Figure, attached).

The purpose of the CIA is to evaluate potential impacts to traditional cultural practices that may result from the proposed project, in accordance with the guidelines for assessing cultural impacts, which were adopted by the State of Hawai‘i Environmental Council on Nov. 19, 1997. For the CIA, the ahupua‘a of Hanamā‘ulu and Niumalu are considered the overall study area, with a particular focus on the areas around Nukoli‘i Beach and the KCC campus.

The CIA will also include a Ka Pa‘akai Analysis. The purpose of the Ka Pa‘akai Analysis is to assist the State of Hawai‘i in fulfilling its obligation to protect “all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua‘a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights” (Article XI, Section 7 of the Constitution of the State of Hawai‘i). It requires that the following specific findings and conclusions be addressed:

(1) The identity and scope of valued cultural, historical, or natural resources within the project area, including the extent to which traditional and customary native Hawaiian rights are exercised;
(2) The extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and
(3) The feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist.

We are reaching out to you for this assessment because you have been identified as a source of knowledge in Hanamā‘ulu and/or Niumalu, or may have recommendations for other individuals that we should contact for this study. We are seeking your kōkua regarding any information related to the following components of our study:

-Cultural associations of Hanamā‘ulu and/or Niumalu such as mo‘olelo or connections to legendary accounts.
-Knowledge of past and present land use within and near the project area.
-Knowledge of past and present traditional gathering practices in Hanamā‘ulu and/or Niumalu.

-Knowledge of cultural resources which may be impacted by the proposed project, including traditional resource gathering sites, traditional access trails, archaeological sites, historic sites, and burials.
-Any other cultural concerns that community members may have in relation to traditional Hawaiian or other cultural practices within or near the proposed project area.
-Referrals to other knowledgeable individuals who may be willing to share their cultural knowledge of the proposed project area and wider Hanamāʻulu and/or Niumalu Ahupuaʻa.

Table 27. Outreach Summary for the Kauaʻi Portions of the HIFL Project Area CIA and Ka Paʻakai Analysis

Name	Affiliation	Initial Contact Date	Comments
Kanoe Ahuna	EAO Hawaii Inc.	3/31/2025	No response received
Julian K. Ako		3/31/2025	Made referrals
Pelika Andrade	Nā Maka Onaona	3/31/2025	No response received
Healani Asing	Kaiola Canoe Club	3/31/2025	No response received
Scott Bacon	Mālama Nā ʻApapa	3/31/2025	No response received
Sara Bowen	Mālama Hulēʻia	3/31/2025	No response received
Chucky Chock	Kauaʻi Museum	4/8/2025	No response received
Dennis Chun	Kauaʻi Community College	3/31/2025	No response received
Roslyn Cummings	E Ola Kākou Hawaiʻi	3/31/2025	No response received
Megan Fox	Mālama Kauaʻi	3/31/2025	No response received
	Grove Farm Museum	3/31/2025	Made referrals
	Hanamaʻulu Community Association	3/31/2025	No response received
	Hanalei Watershed Hui	6/9/2025	No response received
Liberta Hussey-Albao	Queen Deborah Kapule Hawaiian Civic Club	3/31/2025	No response received
Robert Kajiwara	Kauaʻi Community College	3/31/2025	No response received
Llewellyn Kaʻohelauliʻi	ʻAha Moku Council	3/31/2025	No response received
	Kawaikini New Century Public Charter School	4/8/2025	No response received
Nalani Blane Kealaiki	Hālau o Puʻuloa	6/9/2025	No response received
Lester Matsushima		3/31/2025	No response received
Noa Mau-Espirito	Na Mookupuna O Wailua	3/31/2025	No response received
Amber McClure	Moloaʻa Bay Coffee	3/31/2025	No response received
Daphne Hirokane McClure	Moloaʻa Bay Coffee	3/31/2025	No response received
Nancy McPherson	Department of Hawaiian Home Lands	3/31/2025	No response received
Malia Nobrega-Olivera	Moku o Manokalanipō, the Kauaʻi Council of the Association of Hawaiian Civic Clubs	3/31/2025	No response received
Kamealoha Hanohano Pa-Smith	Hanalei River Heritage Foundation	3/31/2025	No response received
David Peters	Hoʻola Lahui Hawaiʻi	3/31/2025	No response received
Sarah Peters	Kaumualiʻi Hawaiian Civic Club	3/31/2025	No response received
Susan Remoaldo	Kauaʻi Historic Preservation Review Commission	3/31/2025	No response received
Mary Requilman	Kauaʻi Historical Society	3/31/2025	No response received
Puanani Rogers	Hoʻokipa Network	3/31/2025	No response received
Pualiʻiliʻimaikalani Rossi	Kauaʻi Community College	3/31/2025	No response received
Bernadette Sakoda	Kauaʻi Island Finance, Inc.	3/31/2025	No response received
Donna Kaliko Santos	Nā Kuleana o Kānaka ʻŌiwi	3/31/2025	No response received

Name	Affiliation	Initial Contact Date	Comments
Stacy M. Sproat	Waipā Foundation	3/31/2025	No response received
Jan TenBruggencate	Kaiola Canoe Club	3/31/2025	Provided comments via email on 4/4/2025
Mehana Vaughan	University of Hawai‘i at Mānoa	3/31/2025	No response received
Marisa Valenciano	Kaua‘i Historic Preservation Review Commission	3/31/2025	Acknowledged receipt; plan to provide comments during Section 106 process
Gary Vinge	Hale Kiawe Senior Fishing Club	4/10/2025	No response received
Naomi Yokotake	‘Ahahui Kīwila Hawai‘i O Mo‘ikeha	3/31/2025	No response received

Scoping and Community Outreach letters for the Oʻahu Cable Landing Site contained the following text:

> The State of Hawaiʻi, represented by the University of Hawaiʻi (UH) Vice President for Information Technology and Chief Information Officer, is proposing the Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system intended to improve and expand high-speed internet access (broadband) throughout the State of Hawaiʻi. To assist with obtaining the necessary permits for the project, UH has engaged Ocean Networks Inc. (ONI), a private company specializing in the development, operation, and maintenance of submarine fiber optic cables.
>
> The HIFL Project involves construction, operation, and maintenance of an interisland subsea cable with cable landing sites located on Kauaʻi, Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Island. The subsea cable, which would be less than two inches in diameter, would be surface-laid on the seabed within State and U.S. Federal waters to interconnect the islands. At all six cable landing sites, horizontal directional drilling (HDD) would be used to install conduit to facilitate installation of the cable underneath the shoreline to an offshore punchout location in nearshore waters. Facilities on each island would include a beach manhole, terrestrial fiber optic cable, and a cable landing station with associated cable termination and monitoring equipment. Additional information regarding the project is attached to this letter; information is also available on the project website (https://www.hifl.llc/).
>
> Pacific Legacy, Inc. is conducting Cultural Impact Assessments (CIAs) and Ka Paʻakai Analyses for the six proposed HIFL cable landing sites:
>
> - Nukoliʻi Beach, Hanamāʻulu and Niumalu Ahupuaʻa, Līhuʻe District, Kauaʻi Island
> - Barbers Point Beach Park, Honouliuli Ahupuaʻa, ʻEwa Moku, Oʻahu Island
> - Kahului Harbor, Wailuku Ahupuaʻa, Wailuku Moku, Maui Island
> - Molokai Yacht Club, Kaunakakai Ahupuaʻa, Kona Moku, Molokai Island
> - Mānele Harbor, Pālāwai Ahupuaʻa, Kona Moku, Lānaʻi Island
> - Pacific Aquaculture & Coastal Resource Center (PACRC), Hilo, Waiākea Ahupuaʻa, South Hilo District, Hawaiʻi Island
>
> This letter contains information specific to the landing site at Barbers Point Beach Park in Honouliuli Ahupuaʻa, though we would also welcome input or referrals for any of the HIFL cable landing sites listed above. Consultation letters with information specific to each cable landing site are available on request.
>
> The Barbers Point Beach Park Project Area
>
> The proposed Oʻahu cable landing site is located at Barbers Point Beach Park in Kalaeloa on the south side of Oʻahu (see attachment). This site would require two HDD conduits: one extending approximately 4,500 ft (1,370 m) from a beach manhole to the nearshore waters punchout point for the cable connecting to Kauaʻi, and the other extending approximately 5,200 ft (1,585 m) from a beach manhole to the nearshore waters punchout point for the cable connecting to Maui. The punchout points would be at water depths of approximately 60 ft (18 m) and 65 ft (20 m), respectively. The beach manholes and associated work areas would be located in an undeveloped portion of the beach park, near the existing bathroom facilities. At the beach manholes, the subsea cables would each be spliced to a terrestrial cable, which would be installed in new underground conduit to a manhole located next to an existing utility pole at the end of Olai St. From this point, the project would utilize fiber owned by a licensed utility as part of an existing utility network, generally following a route along county and state roadways to DR Fortress in central Honolulu. Space within an existing

building at DR Fortress would be used as the cable landing station. En route, the fiber optic cable would also connect to the UH West Oʻahu campus, with space in an existing building used as a HIFL access point.

A desktop review was completed by Pacific Legacy to identify previously documented historic properties in the vicinity of proposed areas of ground disturbance for the project area. Previous studies did not identify any historic properties within the areas of proposed ground disturbance for the HIFL Barbers Point Beach Park project area. Historic properties in the vicinity include complexes of limestone pits, some of which have been used for pre-Contact agriculture or have been found to house paleontological deposits, cultural midden, and/or burials; post-Contact agricultural infrastructure; a WWII-era military complex; and the Barbers Point Lighthouse. The closest known burial is approximately 456 m from the project area. A review of offshore resources identified two potential submerged cultural resources in the vicinity of the project area: the Arthur, a British brig belonging to Captain Barber which was reported lost near Barbers Point in 1796; and Liliu, a schooner reported lost in 1877.

The purpose of the CIA is to evaluate potential impacts to traditional cultural practices that may result from the proposed project, in accordance with the guidelines for assessing cultural impacts, which were adopted by the State of Hawaiʻi Environmental Council on Nov. 19, 1997. For the CIA, the ahupuaʻa of Honouliuli is considered the overall study area, with a particular focus on the areas around Barbers Point Beach Park.

The CIA will also include a Ka Paʻakai Analysis. The purpose of the Ka Paʻakai Analysis is to assist the State of Hawaiʻi in fulfilling its obligation to protect "all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupuaʻa tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights" (Article XI, Section 7 of the Constitution of the State of Hawaiʻi). It requires that the following specific findings and conclusions be addressed:

(1) The identity and scope of valued cultural, historical, or natural resources within the project area, including the extent to which traditional and customary native Hawaiian rights are exercised;
(2) The extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and
(3) The feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist.
We are reaching out to you for this assessment because you have been identified as a source of knowledge in Honouliuli, or may have recommendations for other individuals that we should contact for this study. We are seeking your kōkua regarding any information related to the following components of our study:

-Cultural associations of Honouliuli such as moʻolelo or connections to legendary accounts.
-Knowledge of past and present land use within and near the project area.
-Knowledge of past and present traditional gathering practices in Honouliuli.
-Knowledge of cultural resources which may be impacted by the proposed project, including traditional resource gathering sites, traditional access trails, archaeological sites, historic sites, and burials.
-Any other cultural concerns that community members may have in relation to traditional Hawaiian or other cultural practices within or near the proposed project area.
-Referrals to other knowledgeable individuals who may be willing to share their cultural knowledge of the proposed project area and wider Honouliuli Ahupuaʻa.

Table 28. Outreach Summary for the Oʻahu Portion of the HIFL Project Area CIA

Name	Affiliation	Initial Contact Date	Comments
Scott Abrigo	Kapolei Community Development Corporation	3/31/2025	No response received
Jacob Aki	Ke One O Kākuhihewa	3/31/2025	No response received
Thomas Anuhealiʻi	Gill Ewa Lands	3/31/2025	No response received
John Bond		3/31/2025	No response received
Mana Cáceres	Hui Iwi Kuamoʻo	3/31/2025	Responded with letter 8/12/2025. See Appendix C
Anthony Chance	Hui o Hoʻohonua	6/16/2025	No response received
Ross Cordy	University of Hawaiʻi - West Oʻahu	3/31/2025	No response received
Mary-Lindsey "M.L." Kalikolani Correa	University of Hawaiʻi - West Oʻahu	3/31/2025	Acknowledged receipt and offered to forward to additional parties
Amanda Crabtree-Loo	Alakaʻi Foundation Inc.	3/31/2025	No response received
Ulukoa Duhaylonsod	Kaʻuikiokapō	6/17/2025	No response received
	ʻEwa Puʻuloa Hawaiian Civic Club	4/11/2025	No response received
Victoria Holt Takamine	PAʻI Foundation	3/31/2025	No response received
Wallace K. Ito	Kuaʻāina Ulu ʻAuamo	3/31/2025	No response received
Kimberly Kalama	Hoakalei Cultural Foundation	3/31/2025	No response received
Thor Kamakaʻala	Gill Ewa Lands	4/11/2025	Declined to participate
Shad Kane	ʻAha Moku Council	3/31/2025	No response received
Nālani Blane Kealaiki	Hālau o Puʻuloa	6/9/2025	No response received
Lani Maʻa Lapilio	Maʻa ʻOhana	3/31/2025	Acknowledge receipt and offered to forward to additional parties
Saʻiliemanu Lilomaiava-Doktor	University of Hawaiʻi - West Oʻahu	3/31/2025	No response received
Nanea Lo	ʻOhana Lo	3/31/2025	No response received
Karen Luke		3/31/2025	No response received
Zachary Lum	Kāhuli Leo Leʻa	3/31/2025	No response received
Keona Mark	Mahu Ohana	3/31/2025	No response received
Kawika McKeague		3/31/2025	Noted that project area was outside specific area of expertise but offered to help. Did not respond to request for interview
Kuʻupua Kiyuna Mossman	Department of Hawaiian Home Lands	3/31/2025	Expressed interest in participating; did not respond to follow-up emails
Kaimana Namihira	Leeward Community College	3/31/2025	No response received
William O'Brien	Kaʻuikiokapō	3/31/2025	No response received

Name	Affiliation	Initial Contact Date	Comments
Christophor Oliveira	Koa Ike Foundation	4/4/2025	Acknowledged receipt. Did not respond to follow-up email
Kaleo Patterson	Native Hawaiian Church	3/31/2025	No response received
McD Philpotts		3/31/2025	No response received
William K. Richards	The Friends of Hokuleʻa and Hawaiʻiloa	3/31/2025	No response received
Rona Rodenhurst	ʻAhahui Sīwila Hawaiʻi O Kapolei	3/31/2025	No response received
Homelani Schaedel	Maluʻohai Residents' Association	3/31/2025	No response received
Clinton Schultz	Oʻahu Canoe Racing Association	3/31/2025	No response received
Kawika Shook	Kalaeloa Heritage and Legacy Foundation	3/31/2025	No response received
Nettie Tiffany		3/31/2025	No response received
Steve Vendt	Hawaiian Railway Society	3/31/2025	No response received
Dwight Victor	Kalaeloa Heritage and Legacy Foundation	3/31/2025	No response received
Leilani Williams-Solomon	Native Hawaiian Chamber of Commerce	3/31/2025	No response received

Scoping and Community Outreach letters for the Maui Cable Landing Site contained the following text:

> The State of Hawai‘i, represented by the University of Hawai‘i (UH) Vice President for Information Technology and Chief Information Officer, is proposing the Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system intended to improve and expand high-speed internet access (broadband) throughout the State of Hawai‘i. To assist with obtaining the necessary permits for the project, UH has engaged Ocean Networks Inc. (ONI), a private company specializing in the development, operation, and maintenance of submarine fiber optic cables.
>
> The HIFL Project involves construction, operation, and maintenance of an interisland subsea cable with cable landing sites located on Kaua‘i, O‘ahu, Maui, Molokai, Lāna‘i, and Hawai‘i Island. The subsea cable, which would be less than two inches in diameter, would be surface-laid on the seabed within State and U.S. Federal waters to interconnect the islands. At all six cable landing sites, horizontal directional drilling (HDD) would be used to install conduit to facilitate installation of the cable underneath the shoreline to an offshore punchout location in nearshore waters. Facilities on each island would include a beach manhole, terrestrial fiber optic cable, and a cable landing station with associated cable termination and monitoring equipment. Additional information regarding the project is attached to this letter; information is also available on the project website (https://www.hifl.llc/).
>
> Pacific Legacy, Inc. is conducting Cultural Impact Assessments (CIAs) and Ka Pa‘akai Analyses for the six proposed HIFL cable landing sites:
>
> - Nukoli‘i Beach, Hanamā‘ulu and Niumalu Ahupua‘a, Līhu‘e District, Kaua‘i Island
> - Barbers Point Beach Park, Honouliuli Ahupua‘a, ‘Ewa Moku, O‘ahu Island
> - Kahului Harbor, Wailuku Ahupua‘a, Wailuku Moku, Maui Island
> - Molokai Yacht Club, Kaunakakai Ahupua‘a, Kona Moku, Molokai Island
> - Mānele Harbor, Pālāwai Ahupua‘a, Kona Moku, Lāna‘i Island
> - Pacific Aquaculture & Coastal Resource Center (PACRC), Hilo, Waiākea Ahupua‘a, South Hilo District, Hawai‘i Island
>
> This letter contains information specific to the landing site at Kahului Harbor in Wailuku Ahupua‘a, though we would also welcome input or referrals for any of the HIFL cable landing sites listed above. Consultation letters with information specific to each cable landing site are available on request.
>
> The Kahului Harbor Project Area
>
> The proposed cable landing site on the island of Maui is located at Kahului Harbor, on the north side of Central Maui (see attachment). This site would require two HDD conduits: one extending approximately 1,360 ft (415 m) from a beach manhole to the nearshore waters punchout point for the cable extending to O‘ahu, and the other extending approximately 3,375 ft (1,0130 m) from the same beach manhole to the nearshore waters punchout point for the cable extending to Hawai‘i Island. These punchout points would be at water depths of approximately 30 ft (9 m) and 42 ft (13 m), respectively. In addition to the two HDD conduits for the project, a third HDD conduit would be installed for future subsea cable use; this HDD would extend approximately 1,360 ft (415 m) from a separate beach manhole to the nearshore waters punchout point at a water depth of approximately 30 ft (9 m). The beach manholes and associated work areas would be located within an undeveloped area on the western harbor breakwater. At the beach manhole, the subsea cables would each be spliced to a terrestrial cable, which would be installed underground in new conduit extending from

the western breakwater, under and along Kahului Beach Rd. and Wahinepio Ave. The underground conduit would terminate at the cable landing station, consisting of a new modular structure in the area currently used for the recycling center on the northwestern edge of the UH Maui College campus. An additional underground conduit would be installed from the cable landing station to an adjacent building on the UH Maui College campus to connect the project with the exiting telecommunication and utility network.

A desktop review was completed by Pacific Legacy to identify previously documented historic properties in the vicinity of proposed areas of ground disturbance for the project area. Previous studies identified a single historic property within the area of proposed ground disturbance for the project area: a former military camp installation associated with World War II (SIHP 50-50-04-04232). Portions of the project area are also within the Kahului Harbor Historic District (SIHP 50-50-04-02953). A number of burials have been identified in the vicinity (within a 0.5-mile radius) of proposed ground disturbance. The closest known burial is approximately 600 ft (184 m) from the project area. A review of offshore resources identified the presence of a single submerged resource within the vicinity of the project area: the Lyra, a whaling ship lost in 1830.

The purpose of the CIA is to evaluate potential impacts to traditional cultural practices that may result from the proposed project, in accordance with the guidelines for assessing cultural impacts, which were adopted by the State of Hawai'i Environmental Council on Nov. 19, 1997. For the CIA, the ahupua'a of Wailuku is considered the overall study area, with a particular focus on the areas around Kahului Harbor and the UH Maui College campus.

The CIA will also include a Ka Pa'akai Analysis. The purpose of the Ka Pa'akai Analysis is to assist the State of Hawai'i in fulfilling its obligation to protect "all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights" (Article XI, Section 7 of the Constitution of the State of Hawai'i). It requires that the following specific findings and conclusions be addressed:
(1) The identity and scope of valued cultural, historical, or natural resources within the project area, including the extent to which traditional and customary native Hawaiian rights are exercised;
(2) The extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and
(3) The feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist.

We are reaching out to you for this assessment because you have been identified as a source of knowledge in Wailuku, or may have recommendations for other individuals that we should contact for this study. We are seeking your kōkua regarding any information related to the following components of our study:

-Cultural associations of Wailuku such as mo'olelo or connections to legendary accounts.
-Knowledge of past and present land use within and near the project area.
-Knowledge of past and present traditional gathering practices in Wailuku.
-Knowledge of cultural resources which may be impacted by the proposed project, including traditional resource gathering sites, traditional access trails, archaeological sites, historic sites, and burials.
-Any other cultural concerns that community members may have in relation to traditional Hawaiian or other cultural practices within or near the proposed project area.
-Referrals to other knowledgeable individuals who may be willing to share their cultural knowledge of the proposed project area and wider Wailuku Ahupua'a.

Table 29. Outreach Summary for the Kahului Harbor Portions of the HIFL Project CIA

Name	Affiliation	Initial Contact Date	Comments
Olinda Aiwohi	Paukukalo Hawaiian Homes Community Association	3/31/2025	No response received
Clare Apana	Mālama Kakanilua	3/31/2025	Requested project information via telephone; no response received to letter
Kalani Au	Lokelani Intermediate School	3/31/2025	No response received
Roselle Keliʻihonipua Bailey	Ka ʻImi Naʻauao O Hawaiʻi Nei Institute	3/31/2025	Provided comments via telephone on 4/11/2025
Sharon Balidoy	Laeʻula O Kai	4/11/2025	No response received
Joshua Chavez	Kupa O Waiheʻe	3/31/2025	No response received
Ashley Day		3/31/2025	No response received
Kawika Farm	Maui County Cultural Resources Commission	3/31/2025	No response received
Uluwehi Guerrero	Hālau Hula Kauluokala	4/11/2025	No response received
Keanu Lee Hau	Hawaii Community Foundation - Maui Strong Fund	3/31/2025	No response received
Keomailani H. Hirata	Office of Councilmember Keani Rawlins-Fernandez	3/31/2025	Made referrals
Hōkūlani Holt-Padilla	Paʻu O Hiʻiaka	4/11/2025	No response received
Jerry Isdale	Maui Institute of Art & Technology	3/31/2025	No response received
Clyde Kahalehau	ʻAha Moku O Maui	3/31/2025	No response received
Papaikanīʻau Kaiʻanui	University of Hawaiʻi Maui College	3/31/2025	No response received
Kanoelehua Kamaliʻi-Ligsay	Kamehameha Schools	3/31/2025	No response received
Colsen Kaluawaipakui Kanei	Kawaianuhealehua	3/31/2025	No response received
Keeaumoku Kapu	ʻAha Moku O Maui	3/31/2025	No response received
Uilani Kapu	Nā ʻAikāne o Maui, Inc.	3/31/2025	No response received
Moani Kekahuna	Kumu ʻŌlelo Hawaiʻi, Kamehameha Schools	3/31/2025	No response received
Layne Krause	Maui County Cultural Resources Commission	3/31/2025	No response received
Carlson Kamaka Kūkona III	Hālau o Ka Hanu Lehua	3/31/2025	No response received
Sissy Lake-Farm	Na Hanona Kulike O Piʻilani	3/31/2025	No response received
Cory K. Lehano	Nohona Health, Inc.	3/31/2025	No response received
Burt Lum	Hawaii Broadband and Digital Equity Office	4/2/2025	Provided referrals; interviewed on 5/2/2025
Robert Kalei Luʻuwai	ʻAha Moku O Maui	3/31/2025	Expressed no objections to project via email on 4/4/2025
Kahulu Maluo-Pearson	Maui County Cultural Resources Commission	3/31/2025	No response received

Name	Affiliation	Initial Contact Date	Comments
Kaʻili Moikeha	Hawaiian Canoe Club	3/31/2025	Acknowledged receipt; no further response
Kaponoʻai Molitau	County of Maui Department of ʻŌiwi Resources	3/31/2025	No response received
Brian Kaniela Naeʻole	Brian Kaniela Naeʻole Naauao	3/31/2025	No response received
Carmela Leilani Noneza	Hanona Maui	3/31/2025	Acknowledged receipt; no further response
Roy Oliveira	Waiehu Kou Phase 3 Association	3/31/2025	No response received
Daniel L. Ornellas	Waiehu Kou Phase 3 Association	3/31/2025	No response received
Joylynn Paman	Kimokeo Foundation	3/31/2025	Declined participation
Malia Purdy	Hui No Ke Ola Pono	3/31/2025	No response received
Kealiʻi Reichel	Hālau Keʻalaokamaile	3/31/2025	No response received
Kekai Robinson	County of Maui Department of ʻŌiwi Resources	3/31/2025	Acknowledged receipt; no further response
Carl Rozycki	Akakū Maui Community Media	3/31/2025	No response received
Leona Leiʻohu Ryder	Pili Koko	3/31/2025	No response received
Joy Keopuolani Salvador	Halau Keala Kahinano O Puna	3/31/2025	No response received
Janet Six	County of Maui	3/31/2025	No response received
Ualani Smith	Halau I Kona Mau Lima	3/31/2025	No response received
Stanley Solamillo	Maui County Cultural Resources Commission	3/31/2025	No response received
David Tamanaha	University of Hawaiʻi Maui College	3/31/2025	No response received
Keolamau Tengan	KAʻEHU	3/31/2025	No response received
Pamela Tumpap	Maui Chamber of Commerce	3/31/2025	No response received
Gary Vigne	Hale Kiawe Senior Fishing Club	4/10/2025	No response received

Scoping and Community Outreach letters for the Molokai Cable Landing Site contained the following text:

> The State of Hawai‘i, represented by the University of Hawai‘i (UH) Vice President for Information Technology and Chief Information Officer, is proposing the Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system intended to improve and expand high-speed internet access (broadband) throughout the State of Hawai‘i. To assist with obtaining the necessary permits for the project, UH has engaged Ocean Networks Inc. (ONI), a private company specializing in the development, operation, and maintenance of submarine fiber optic cables.
>
> The HIFL Project involves construction, operation, and maintenance of an interisland subsea cable with cable landing sites located on Kaua‘i, O‘ahu, Maui, Molokai, Lāna‘i, and Hawai‘i Island. The subsea cable, which would be less than two inches in diameter, would be surface-laid on the seabed within State and U.S. Federal waters to interconnect the islands. At all six cable landing sites, horizontal directional drilling (HDD) would be used to install conduit to facilitate installation of the cable underneath the shoreline to an offshore punchout location in nearshore waters. Facilities on each island would include a beach manhole, terrestrial fiber optic cable, and a cable landing station with associated cable termination and monitoring equipment. Additional information regarding the project is attached to this letter; information is also available on the project website (https://www.hifl.llc/).
>
> Pacific Legacy, Inc. is conducting Cultural Impact Assessments (CIAs) and Ka Pa‘akai Analyses for the six proposed HIFL cable landing sites:
>
> - Nukoli‘i Beach, Hanamā‘ulu and Niumalu Ahupua‘a, Līhu‘e District, Kaua‘i Island
> - Barbers Point Beach Park, Honouliuli Ahupua‘a, ‘Ewa Moku, O‘ahu Island
> - Kahului Harbor, Wailuku Ahupua‘a, Wailuku Moku, Maui Island
> - Molokai Yacht Club, Kaunakakai Ahupua‘a, Kona Moku, Molokai Island
> - Mānele Harbor, Pālāwai Ahupua‘a, Kona Moku, Lāna‘i Island
> - Pacific Aquaculture & Coastal Resource Center (PACRC), Hilo, Waiākea Ahupua‘a, South Hilo District, Hawai‘i Island
>
> This letter contains information specific to the landing site at the Molokai Yacht Club in Kaunakakai Ahupua‘a, though we would also welcome input or referrals for any of the HIFL cable landing sites listed above. Consultation letters with information specific to each cable landing site are available on request.
>
> **The Molokai Yacht Club Project Area**
>
> The proposed cable landing site on the island of Molokai is located just west of Kaunakakai Harbor in an area used by the Molokai Yacht Club on the south side of the island (see attachment). This site would include a single HDD conduit, extending approximately 1,000 ft (300 m) from a beach manhole to the nearshore waters punchout point at a water depth of approximately 3 ft (1.0 m). The beach manhole and associated work areas would be sited in an undeveloped area adjacent to the yacht club facilities. From the beach manhole, terrestrial cable would be installed in an underground conduit extending to a manhole sited next to an existing utility pole adjacent to Mauna Loa Highway. From this point, the project would utilize fiber owned by a licensed utility as part of the existing overhead utility network, extending along Mauna Loa / Kamehameha V Highway and into the Molokai Education Center. A new terrestrial cable would be installed in underground conduit from the Molokai Education Center to the cable landing station, which would be a new modular structure located on the property of the Molokai Education Center.

A desktop review was completed by Pacific Legacy to identify previously documented historic properties in the vicinity of proposed areas of ground disturbance for the project area. Previous studies identified two pre-Contact subsurface cultural deposits (SIHP 50-60-03-00630 and -00632) and one post-Contact cultural deposit (SIHP 50-60-03-02573) within the area of proposed ground disturbance. In addition, the Molokai Public Library (SIHP 50-60-03-01037) abuts the mauka edge of the project area (see Figure 1, attached). A review of offshore resources identified the presence of an unknown submerged resource within the vicinity of the project area; however, no further information is available for this resource (Record Number 1253; BOEM 2017).

The purpose of the CIA is to evaluate potential impacts to traditional cultural practices that may result from the proposed project, in accordance with the guidelines for assessing cultural impacts, which were adopted by the State of Hawai'i Environmental Council on Nov. 19, 1997. For the CIA, the ahupua'a of Kaunakakai is considered the overall study area, with a particular focus on the areas around the Molokai Yacht Club and Molokai Education Center.

The CIA will also include a Ka Pa'akai Analysis. The purpose of the Ka Pa'akai Analysis is to assist the State of Hawai'i in fulfilling its obligation to protect "all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights" (Article XI, Section 7 of the Constitution of the State of Hawai'i). It requires that the following specific findings and conclusions be addressed:

(1) The identity and scope of valued cultural, historical, or natural resources within the project area, including the extent to which traditional and customary native Hawaiian rights are exercised;
(2) The extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and
(3) The feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist.

We are reaching out to you for this assessment because you have been identified as a source of knowledge in Kaunakakai, or may have recommendations for other individuals that we should contact for this study. We are seeking your *kōkua* regarding any information related to the following components of our study:

-Cultural associations of Kaunakakai such as mo'olelo or connections to legendary accounts.
-Knowledge of past and present land use within and near the project area.
-Knowledge of past and present traditional gathering practices in Kaunakakai.
-Knowledge of cultural resources which may be impacted by the proposed project, including traditional resource gathering sites, traditional access trails, archaeological sites, historic sites, and burials.
-Any other cultural concerns that community members may have in relation to traditional Hawaiian or other cultural practices within or near the proposed project area.
-Referrals to other knowledgeable individuals who may be willing to share their cultural knowledge of the proposed project area and wider Kaunakakai Ahupua'a.

Table 30. Outreach Summary for the Molokai Yacht Club portions of the HIFL Project Area CIA

Name	Affiliation	Initial Contact Date	Comments
Vivian L. Ainoa	Kamiloloa One Aliʻi Homestead Association	3/31/2025	No response received
Malia Akutagawa	University of Hawaiʻi at Mānoa Hawaiʻinuiākea School of Hawaiian Knowledge	4/17/2025	No response received
Louella ʻOpuʻulani Albino		3/31/2025	No response received
Rogerene Arce		3/31/2025	No response received
Justin Avelino		3/31/2025	No response received
Lori Buchanan		3/31/2025	No response received
Braeden Cabael-Kaʻahanui		3/31/2025	No response received
Gene Ross Davis		3/31/2025	No response received
Rosie Davis		3/31/2025	No response received
Carrie DeCoite Caparida		3/31/2025	No response received
Dillon DeCoite		3/31/2025	No response received
Mervin Dudoit Jr.	ʻAha Moku O Molokai	3/31/2025	No response received
Mervin Dudoit Sr	ʻAha Moku O Molokai	3/31/2025	No response received
Teave H. Heen		4/5/2025	Provided feedback via email on 4/8/2025 and provided written testimony, see Appendix C
Kekama Helm		3/31/2025	No response received
Michael Hikalea	Puʻuhonua o Wailupe	3/31/2025	No response received
Chadlyn Hirata		3/31/2025	No response received
Keomailani Hanapi Hirata	Councilmember Keani Rawlins-Fernandez, Molokai District Office	3/31/2025	No response received
Alice Kaʻahanui		3/31/2025	No response received
Charles Kaahanui III		3/31/2025	No response received
Dara Kaʻahanui		3/31/2025	No response received
Shannon Kaʻahanui		3/31/2025	No response received
Lei Makana Kaneakua	Molokai High School	3/31/2025	No response received
Halona Kaopuiki	Office of Hawaiian Affairs	3/31/2025	No response received
Iolani Kuoha		3/31/2025	No response received
Kimberly Lani		3/31/2025	Acknowledged receipt
Lawrence K. Lasua	Hawaiian Homes Commission	3/31/2025	No response received
Pūlama Lima	Ka Ipu Makani	3/31/2025	No response received
Zhantell K.M. Lindo	County of Maui Molokai District Office	3/31/2025	No response received
Sybil Lopez	Department of Planning, County of Maui Molokai District Office	3/31/2025	Made referrals
Emily Mahiai		3/31/2025	No response received
F. Mahiai		3/31/2025	No response received
Kauʻi Manera	Alu Like	3/31/2025	No response received
Penny Martin	ʻOhana Waʻa	3/31/2025	No response received
Katy Mokuau	Sustʻāinable Molokai	3/31/2025	No response received

Name	Affiliation	Initial Contact Date	Comments
Tanya Maile Naehu	Hui o Kuapā	3/31/2025	No response received
Nahulu Maioho		3/31/2025	No response received
Robert Nerveza-Shizuma		3/31/2025	No response received
Beverly Pauole-Moore		3/31/2025	No response received
Mikiʻala Pescaia		3/31/2025	No response received
Heather Place	Sustainable Molokai	3/31/2025	No response received
Kelson Mac Poepoe		3/31/2025	No response received
Karen Kamalu Poepoe	Maui County Cultural Resources Commission	3/31/2025	No response received
Mahina M. Poepoe	Kupeke Ahupuaʻa	3/31/2025	No response received
Mahina M. Poepoe	Hawaiʻi State House of Representatives District 13	3/31/2025	No response received
Kammy Purdy	Ahupuaʻa o Molokai	3/31/2025	No response received
Walter Rawlins	ʻAha Moku O Molokai	3/31/2025	No response received
Keani Rawlins-Fernandez	Maui County Council	3/31/2025	No response received
Walter Ritte	ʻĀina Momona	3/31/2025	Acknowledged receipt
Sheron Sasada		3/31/2025	Provided feedback via email on 3/31/2025; provided referrals
Sherry Sasada		3/31/2025	No response received
Robert Shizuma		3/31/2025	No response received
Andrea Chiemi Talon		3/31/2025	Expressed support for the project via email on 4/17/2025 and provided referrals
	Waʻa Kapae Mua Canoe Club	4/7/2025	No response received
Mary Randall Wagner	Maui County Cultural Resource Commission	3/31/2025	No response received
Faye Liko Wallace	Molokai Canoe Club	3/31/2025 4/7/2025	No response received
Trisha Kehaulani Watson	ʻĀina Momona	3/31/2025	No response received
Viola Wichman		3/31/2025	No response received

Scoping and Community Outreach letters for the Lānaʻi Cable Landing Site contained the following text:

> The State of Hawaiʻi, represented by the University of Hawaiʻi (UH) Vice President for Information Technology and Chief Information Officer, is proposing the Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system intended to improve and expand high-speed internet access (broadband) throughout the State of Hawaiʻi. To assist with obtaining the necessary permits for the project, UH has engaged Ocean Networks Inc. (ONI), a private company specializing in the development, operation, and maintenance of submarine fiber optic cables.
>
> The HIFL Project involves construction, operation, and maintenance of an interisland subsea cable with cable landing sites located on Kauaʻi, Oʻahu, Maui, Molokai, Lānaʻi, and Hawaiʻi Island. The subsea cable, which would be less than two inches in diameter, would be surface-laid on the seabed within State and U.S. Federal waters to interconnect the islands. At all six cable landing sites, horizontal directional drilling (HDD) would be used to install conduit to facilitate installation of the cable underneath the shoreline to an offshore punchout location in nearshore waters. Facilities on each island would include a beach manhole, terrestrial fiber optic cable, and a cable landing station with associated cable termination and monitoring equipment. Additional information regarding the project is attached to this letter; information is also available on the project website (https://www.hifl.llc/).
>
> Pacific Legacy, Inc. is conducting Cultural Impact Assessments (CIAs) and Ka Paʻakai Analyses for the six proposed HIFL cable landing sites:
>
> - Nukoliʻi Beach, Hanamāʻulu and Niumalu Ahupuaʻa, Līhuʻe District, Kauaʻi Island
> - Barbers Point Beach Park, Honouliuli Ahupuaʻa, ʻEwa Moku, Oʻahu Island
> - Kahului Harbor, Wailuku Ahupuaʻa, Wailuku Moku, Maui Island
> - Molokai Yacht Club, Kaunakakai Ahupuaʻa, Kona Moku, Molokai Island
> - Mānele Harbor, Pālāwai Ahupuaʻa, Kona Moku, Lānaʻi Island
> - Pacific Aquaculture & Coastal Resource Center (PACRC), Hilo, Waiākea Ahupuaʻa, South Hilo District, Hawaiʻi Island
>
> This letter contains information specific to the landing site at Mānele Harbor in Pālāwai Ahupuaʻa, though we would also welcome input or referrals for any of the HIFL cable landing sites listed above. Consultation letters with information specific to each cable landing site are available on request.
>
> **Mānele Harbor (Lānaʻi Island) Project Area**
>
> The proposed cable landing site on Lānaʻi is located at the Mānele Small Boat Harbor on the south side of the island (see attachment). This site would include a single HDD conduit, extending approximately 870 ft (265 m) from a beach manhole to the punchout point at a water depth of approximately 23 ft (7 m). The beach manhole and associated work areas would be sited in the southern-most parking lot for the Small Boat Harbor. From the beach manhole, the terrestrial cable would be installed in trenched conduit to a new cable landing station located on undeveloped land immediately adjacent to the harbor. Additional underground conduit would be installed from the cable landing station to nearby manhole(s) to connect the project with the existing telecommunication and utility network.
>
> A desktop review completed by Pacific Legacy identified three archaeological studies previously carried out inside portions of the project area (Soehren 1964, Kaschko and Athens 1987, Berrigan et al. 2008). The earliest of these studies observed that the area had

already been significantly altered by the construction of harbor facilities (Soehren 1964). Kepā Maly completed an ethnohistoric survey (2013) that included the project area and noted that subsequent grading associated with the Mānele Small Boat Harbor Project also encountered burials and impacted or destroyed a number of historic properties in and around the harbor area. Most of the previously identified sites in the vicinity of the project area are multi-function habitation complexes, including SIHP 50-40-98-01523 and -01525. This area also contains a number of possible burial sites (Figure 1, attached). Although previous archaeological studies did not identify any historic properties in the area of proposed ground disturbance within the project area, the desktop review concluded that there is potential to encounter subsurface archaeological historic properties in the area.

The purpose of the CIA is to evaluate potential impacts to traditional cultural practices that may result from the proposed project, in accordance with the guidelines for assessing cultural impacts, which were adopted by the State of Hawai'i Environmental Council on Nov. 19, 1997. For the CIA, the ahupua'a of Pālāwai is considered the overall study area, with a particular focus on the area around Mānele Harbor.

The CIA will also include a Ka Pa'akai Analysis. The purpose of the Ka Pa'akai Analysis is to assist the State of Hawai'i in fulfilling its obligation to protect "all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights" (Article XI, Section 7 of the Constitution of the State of Hawai'i). It requires that the following specific findings and conclusions be addressed:
(1) The identity and scope of valued cultural, historical, or natural resources within the project area, including the extent to which traditional and customary native Hawaiian rights are exercised;
(2) The extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and
(3) The feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist.

We are reaching out to you for this assessment because you have been identified as a source of knowledge in Pālāwai, or may have recommendations for other individuals that we should contact for this study. We are seeking your kōkua regarding any information related to the following components of our study:

-Cultural associations of Pālāwai such as mo'olelo or connections to legendary accounts.
-Knowledge of past and present land use within and near the project area.
-Knowledge of past and present traditional gathering practices in Pālāwai.
-Knowledge of cultural resources which may be impacted by the proposed project, including traditional resource gathering sites, traditional access trails, archaeological sites, historic sites, and burials.
-Any other cultural concerns that community members may have in relation to traditional Hawaiian or other cultural practices within or near the proposed project area.
-Referrals to other knowledgeable individuals who may be willing to share their cultural knowledge of the proposed project area and wider Pālāwai Ahupua'a.

Table 31. Outreach Summary for the Lānaʻi Portion of the HIFL Project Area CIA

Name	Affiliation	Initial Contact Date	Comments
Pamela Alconcel	Lānaʻi Education Center	4/7/2025	Acknowledged receipt; discussed project via group email
Winifred Basques	Hauʻouiwi Homestead Association on Lānaʻi	3/31/2025	No response received
Nina Garcia	ʻAha Moku O Lānaʻi	3/31/2025	No response received.
Phyllis Coochie Cayan	ʻAha Moku O Lānaʻi	3/31/2025	No response received.
Nina Garcia	Lānaʻi Education Center	4/8/2025	No response received.
Kainoa Kanno	ʻAha Moku O Lānaʻi	3/31/2025	No response received.
Kepā and Onaona Maly	Kumu Pono Associates LLC	3/31/2025	Made referrals and provided feedback via group email
Benjamin Ostrander	Pūlama Lānaʻi	3/31/2025	Acknowledged receipt; discussed project via group email
Shelly Kaleialoha Kaiaokamaile	Lānaʻi Cultural and Heritage Center	3/31/2025	Acknowledged receipt; discussed project via group email
Diane Preza	Pūlama Lānaʻi	3/31/2025	Acknowledged receipt; discussed project via group email
George Purdy	ʻAha Moku O Lānaʻi	3/31/2025	Acknowledged receipt
Mary Randall Wagner	Maui County Cultural Resource Commission	3/31/2025	No response received

Scoping and Community Outreach letters for the Hawai‘i Island Cable Landing Site contained the following text:

> The State of Hawai‘i, represented by the University of Hawai‘i (UH) Vice President for Information Technology and Chief Information Officer, is proposing the Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system intended to improve and expand high-speed internet access (broadband) throughout the State of Hawai‘i. To assist with obtaining the necessary permits for the project, UH has engaged Ocean Networks Inc. (ONI), a private company specializing in the development, operation, and maintenance of submarine fiber optic cables.
>
> The HIFL Project involves construction, operation, and maintenance of an interisland subsea cable with cable landing sites located on Kaua‘i, O‘ahu, Maui, Molokai, Lāna‘i, and Hawai‘i Island. The subsea cable, which would be less than two inches in diameter, would be surface-laid on the seabed within State and U.S. Federal waters to interconnect the islands. At all six cable landing sites, horizontal directional drilling (HDD) would be used to install conduit to facilitate installation of the cable underneath the shoreline to an offshore punchout location in nearshore waters. Facilities on each island would include a beach manhole, terrestrial fiber optic cable, and a cable landing station with associated cable termination and monitoring equipment. Additional information regarding the project is attached to this letter; information is also available on the project website (https://www.hifl.llc/).
>
> Pacific Legacy, Inc. is conducting Cultural Impact Assessments (CIAs) and Ka Pa‘akai Analyses for the six proposed HIFL cable landing sites:
>
> - Nukoli‘i Beach, Hanamā‘ulu and Niumalu Ahupua‘a, Līhu‘e District, Kaua‘i Island
> - Barbers Point Beach Park, Honouliuli Ahupua‘a, ‘Ewa Moku, O‘ahu Island
> - Kahului Harbor, Wailuku Ahupua‘a, Wailuku Moku, Maui Island
> - Molokai Yacht Club, Kaunakakai Ahupua‘a, Kona Moku, Molokai Island
> - Mānele Harbor, Pālāwai Ahupua‘a, Kona Moku, Lāna‘i Island
> - Pacific Aquaculture & Coastal Resource Center (PACRC), Hilo, Waiākea Ahupua‘a, South Hilo District, Hawai‘i Island
>
> This letter contains information specific to the landing site at the PACRC in Waiākea Ahupua‘a, though we would also welcome input or referrals for any of the HIFL cable landing sites listed above. Consultation letters with information specific to each cable landing site are available on request.
>
> **The PACRC (Hilo, Hawai‘i Island) Project Area**
>
> The proposed Hilo cable landing site is located at PACRC just east of the Hilo Harbor breakwater on the east side of Hawai‘i Island (see attachment). Given the presence of buried wastewater utility pipes in the immediate vicinity of the cable landing, the HDD conduit would be specifically sited to facilitate crossing of the wastewater utility pipes, surfacing in shallow water just seaward of the shoreline. Beyond this point, the cable would be surface-laid on the ocean floor; split pipe would be installed over approximately 3,600 ft (1,097 m) of cable to provide additional protection and minimize movement due to wave energy in the nearshore waters. From the beach manhole, the terrestrial cable would be installed in underground conduit to a manhole installed adjacent to a nearby utility pole. From this point, the project would utilize fiber owned by a licensed utility as part of the existing utility network, extending along state and county roadways as well as via existing underground conduit, terminating at UH Hilo. The cable landing station for this site would be a new modular structure constructed on the northern side of the UH Hilo campus near Lanikāula

Street. An additional underground conduit would be installed from the cable landing station to an adjacent building on the UH Hilo campus to connect the project with the exiting telecommunication and utility network.

A desktop review completed by Pacific Legacy did not identify any previous archaeological studies carried out within the areas of proposed ground disturbance for the project area, though a small number of archaeological studies have been completed in the nearby vicinity. Nearby historic properties include the Hilo Breakwater (SIHP 50-10-35-07441) on the makai side of the project area (Figure 1, attached), and a number of sites related to post-Contact agricultural activities on the mauka side (Figure 2, attached). No burials were identified within a 0.5-mile radius of the project area.

The purpose of the CIA is to evaluate potential impacts to traditional cultural practices that may result from the proposed project, in accordance with the guidelines for assessing cultural impacts, which were adopted by the State of Hawai'i Environmental Council on Nov. 19, 1997. For the CIA, the ahupua'a of Waiākea is considered the overall study area, with a particular focus on the areas around Hilo Bay and the UH Hilo campus.

The CIA will also include a Ka Pa'akai Analysis. The purpose of the Ka Pa'akai Analysis is to assist the State of Hawai'i in fulfilling its obligation to protect "all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights" (Article XI, Section 7 of the Constitution of the State of Hawai'i). It requires that the following specific findings and conclusions be addressed:
(1) The identity and scope of valued cultural, historical, or natural resources within the project area, including the extent to which traditional and customary native Hawaiian rights are exercised;
(2) The extent to which those resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action; and
(3) The feasible action, if any, to be taken by the agency to reasonably protect native Hawaiian rights if they are found to exist.
We are reaching out to you for this assessment because you have been identified as a source of knowledge in Waiākea, or may have recommendations for other individuals that we should contact for this study. We are seeking your *kōkua* regarding any information related to the following components of our study:

-Cultural associations of Waiākea such as *mo'olelo* or connections to legendary accounts.
-Knowledge of past and present land use within and near the project area.
-Knowledge of past and present traditional gathering practices in Waiākea.
-Knowledge of cultural resources which may be impacted by the proposed project, including traditional resource gathering sites, traditional access trails, archaeological sites, historic sites, and burials.
-Any other cultural concerns that community members may have in relation to traditional Hawaiian or other cultural practices within or near the proposed project area.
-Referrals to other knowledgeable individuals who may be willing to share their cultural knowledge of the proposed project area and wider Waiākea Ahupua'a.
-Referrals to other knowledgeable individuals who may be willing to share their cultural knowledge of the proposed project area and wider Wailuku Ahupua'a.

Table 32. Outreach Summary for the Portion of the HIFL Project Area CIA on Hawai'i Island

Name	Affiliation	Initial Contact Date	Comments
Laura Acasio	Former State Senator	3/31/2025	No response received
Lehua Waipā Ah Nee	Keaukaha Community Association	3/31/2025	No response received
Antoinette Kauilani Almeida	Panaewa Hawaiian Home Lands Community Association	3/31/2025	No response received
Kamala Anthony	Hui Hoʻoleimaluō	3/31/2025	No response received
Aislen Bacalso	Department of Hawaiian Home Lands	3/31/2025	Facilitated beneficiary consultation through official channels
Lokelani Brandt	Hoaʻāina Heritage Services, LLC	4/8/2025	Interviewed on 4/24/2025
Jeff Cabral	JSC Services LLC	3/31/2025	No response received
Roxanne Costa	Salvation Army Hilo Corps	3/31/2025	No response received
Stanley Costales Jr.	SMC Inc./Sports Line	3/31/2025	No response received
Mahealani Cypher	George K. Cypher ʻOhana	3/31/2025	No response received
Greg DiBenedetto		3/31/2025	No response received
Saturnino Doctor		3/31/2025	No response received
Blossom Uʻilani Evans		3/31/2025	No response received
Hanalei Fergerstrom	Na Kupuna Moku O Keawe	3/31/2025	No response received
Kimo Field	Captain Kimo's Hawaiian Adventures	3/31/2025	No response received
Arthur Hoke	Hawaiian Civic Club of Hilo	3/31/2025	Requested to participate via phone call; no response received to follow-up requests
Kalani Kahalioumi		5/7/2025	No response received
Patrick L. Kahawaiolaʻa	Keaukaha Community Association	3/31/2025	No response received
Shola Kahiapo-Trevino	County of Hawaiʻi	3/31/2025	Acknowledged receipt, offered to distribute to others
Michael Kaleikini	Hawaiian Homes Commission	3/31/2025	Discussed project via phone call; offered to forward information to interested parties
Mānaikalani Kalua	Windward Community College	4/22/2025	No response received
Huihui Kanahele-Mossman	Edith Kanakaʻole Foundation	3/31/2025	No response received
Pualani Kanakaʻole-Kanahele	Hilo Community College	3/31/2025	No response received
Robert Kaneshiro		3/31/2025	No response received
Dr. Halena Kapuni-Reynolds	Smithsonian National Museum of the American Indian	3/31/2025	Interviewed on 4/17/2025; provided referrals
	Keaukaha Community Association	3/31/2025	No response received to letter request; consultation via DHHL beneficiaries meeting
Kapono Kekela	Hui ʻOihana - Hawaii Island Native Hawaiian Chamber of Commerce	3/31/2025	No response received

Name	Affiliation	Initial Contact Date	Comments
Larry Kimura	University of Hawai‘i - Hilo	3/31/2025	Provided referrals
Ronald Kodani	Pi‘ihonua Hawaiian Homestead Community Association	3/31/2025	No response received
Doreen Kodani	Pi‘ihonua Hawaiian Homestead Community Foundation	4/8/2025	No response received
Ka‘iulani Laehā	‘Aha Pūnana Leo	3/31/2025	No response received
Jordan “Kama” Lee Loy	Piihonua Hawaiian Homestead Community Association	3/31/2025	No response received
Chelsea Mack	Rotary Club of Hilo	3/31/2025	No response received
Lilliane Makaila	Department of Hawaiian Home Lands	3/31/2025	No response received
Kialoa K. K. Mossman	Department of Hawaiian Home Lands	5/8/2025	Provided referrals
Terri Napeahi	‘Aha Moku Council	4/3/2025	Phone conversation and request for meeting; did not respond to follow-up requests
Terri Napeahi	Keaukaha Action Network	4/3/2025	Phone conversation and request for meeting; did not respond to follow-up requests
Ann Nathaniel		3/31/2025	No response received
Kanoa Ng	Hui Mālama Ola Nā ‘Ōiwi	3/31/2025	No response received
Les Oliveira	Hawai‘i Hilo Vulcans Athletics	3/31/2025	No response received
Mark Osorio	County of Hawai‘i Parks and Recreation	3/31/2025	No response received
Andrew Rosen	Native Hawaiian Chamber of Commerce	3/31/2025	Expressed interest but did not respond to follow-up requests
William W. Moekahi Steiner	Pacific Agricultural Land Management Systems	3/31/2025	No response received
Wayne Subica	Plantation Museum	3/31/2025	No response received
Ka‘aka Swain	Keaukaha Community Association	3/31/2025	No response received
Amber Ternus	State of Hawaii Broadband and Digital Equity Office	3/31/2025	No response received
Dr. Lehua Veincent	Keaukaha Community Member	6/30/2025	Interviewed on 7/18/2025
Wendy Mapuana Waipā	Keaukaha Community Association	3/31/2025	No response received
Keahi Warfield	Keaukaha One Youth Development	5/7/2025	No response received
Claudia Wilcox-Boucher	Rotary Club of South Hilo	3/31/2025	No response received
Charles Young	‘Aha Moku Council	3/31/2025	No response received
Kuhao Zane		7/1/2025	Acknowledged receipt

APPENDIX B

List of Sample Questions Asked During Interviews

List of sample questions asked during interviews for the HIFL CIA and Ka Paʻakai Analysis

1) Please introduce yourself and tell me a little bit about yourself and your connections to the project area.

2) The purpose of this interview is for a Cultural Impact Assessment and Ka Paʻakai Analysis for the Hawaiian Island Fiber Link Project. This report is being prepared for inclusion in an Environmental Assessment that will be published online and made available to the public. Are you comfortable with information from this conversation being shared in that way?

3) What made you decide to have this talk with me today and are there things you wanted to share?

4) Do you have any questions about the proposed project?

5) The Ka Paʻakai Analysis addresses three questions:

    a. What is in the area that are valued cultural, historical or natural resources within the project area or the extent to which traditional customary Native Hawaiian rights are exercised in the project area. Is there anything that is there, or anything that might be impacted that we haven't discussed?
    b. Do you have any thoughts on how resources, practices, or Native Hawaiian rights could be affected by the project?
    c. Do you have any recommendations for how the project could mitigate impacts to those resources, practices, or rights?

6) Is there anyone else that we should reach out to for the project?

APPENDIX C

Formal Letters Received during Consultation for the CIA and Ka Pa‘akai Analysis

Mana Kaleilani Cáceres

91-225 Pilipiliʻula Place Kapolei, HI 96707
808-222-2777
couldnttakethemana@gmail.com

August 12, 2025

Mara Mulrooney, PhD
146 Hekili Street, Suite 205
Kailua, HI 96734

Aloha e Dr. Mulrooney,

Mahalo for reaching out to me regarding the Cultural Impact Assessment (CIA) and Ka Paʻakai Analysis for the Hawaiian Island Fiber Link Project, Barbers Point Beach Park Cable Landing Site. I appreciate your consideration of cultural resources and traditional practices in Honouliuli Ahupuaʻa, ʻEwa Moku.

Given the importance of this area to our cultural heritage, I would like to provide the following thoughts and recommendations for your assessment:

Potential Presence of Burials (Iwi Kūpuna):
The ahupuaʻa of Honouliuli has historically been an area of significance for Native Hawaiian communities. It is essential to consider the possibility of encountering iwi kūpuna during the project, particularly at the onshore cable landing site and along construction corridors.
Protocols for handling inadvertent discoveries should align with state and federal guidelines, ensuring respect and protection of iwi kūpuna.

Kālua (limestone pits/sinkholes) as Cultural Resources
I would like to reinforce that their significance goes far beyond what they may contain. These limestone pits are ancestral features tied to our identity as kānaka ʻEwa, and their presence represents a continuity of place, practice, and spirituality.

It is not unimaginable that, one day, the people of Honouliuli may return to our documented burial practices, including kanu into these kālua, if protected and respected. What a beautiful restoration of ancestral relationship that would be. This is why these places should be preserved not only as static sites of the past, but as spaces of living potential.

Cultural Resources and Historic Properties:
The identified historic properties and potential submerged resources, such as the *Arthur* and the *Liliu*, warrant careful documentation and preservation efforts. These resources hold cultural and historic significance and should be treated with sensitivity.

Additional surveys to identify pre-contact cultural properties in the project area could be beneficial.

Traditional and Customary Practices:
It would be helpful to consider whether any traditional gathering sites or access trails intersect with the project area. Community input may help identify such sites. The late Uncle Mike Lee was an expert on limu and many of his videos are on YouTube and his ʻike should be recognized in this CIA for this project.

Honouliuli Ahupuaʻa holds rich moʻolelo and cultural associations that should be acknowledged. Consulting with kūpuna (elders) and cultural practitioners may provide deeper insights into these connections.

I would be interested to see if/where this project intersects with the leina a ka ʻuhana or the view plane that's associated with this leina.

Environmental Impacts:
The offshore habitat includes elements such as coral and limu that are important for traditional practices. Any mitigation strategies to minimize impacts on these ecosystems will be appreciated by the community.

Ka Paʻakai Analysis Recommendations:
To protect traditional and customary Native Hawaiian rights, I recommend close collaboration with community members, cultural practitioners, and descendants of Honouliuli, including my ʻohana.

Ensuring public access to findings and facilitating open dialogue will help build trust and respect among all stakeholders.

If additional information or insights are needed, I would be happy to kōkua further. Please feel free to reach out if you would like to schedule a time to discuss this further. I can also provide referrals to other knowledgeable individuals who may offer valuable perspectives.

Mahalo nui loa for your commitment to respecting and preserving our cultural heritage.

Ola nā iwi,

Mana Kaleilani Cáceres

Aloha kākou,

My name is Teave Heen, and I submit this testimony in strong opposition to the proposed Hawaiian Islands Fiber Link Project, specifically regarding the disturbance of our natural marine habitats. As a lifelong paddler and a descendant of generations who have relied on the ocean for sustenance, I stand firmly against any desecration of Kanaloa through the laying of foreign cables or any form of oceanic excavation.

I was raised in a family that lived sustainably off the fish from the sea. My father was a fisherman, and our daily lives revolved around the rhythm of the tides, the abundance of our fisheries, and the sacred responsibility to protect our marine ecosystems. The ocean is not just a resource, it is our identity, our ancestor, and our provider. To disturb it in the name of technological expansion without proper regard for its sanctity and balance is an affront to our cultural, spiritual, and environmental values.

I am a lifelong paddler who has navigated the Kaiwi Channel from Hale o Lono, Molokai, to Oahu, experiencing firsthand the strength and sacred nature of these waters. I have spent my life paddling, surfing, fishing, and diving in these very waters. Iam intimately familiar with the marine ecosystems that are now threatened. This is not just a place of transit, it is a place of deep cultural connection, subsistence, and history for myself and many others who rely on these waters.

Not only have I paddled the Kaiwi Channel where this cable is also planned to lie, but I have also paddled across all the channels connecting our islands; channels that are now under threat by this project. These channels, including the ʻAlenuihāhā, Pailolo, ʻAuʻau, Kalohi, and Kaiwi, are lifelines of our ancestors and remain sacred pathways that connect our islands and people. They are not just bodies of water; they are storied spaces imbued with mana, where generations of Native Hawaiians have traveled, fished, and survived. On each paddle, I have witnessed marine life thriving in their free habitat; dolphins dancing in the waves, honu gliding beneath the surface, and vibrant schools of fish that sustain our people. These creatures, and the delicate ecosystems they inhabit, will be irreparably harmed by this intrusion.

Scientific research has shown that the installation of submarine cables can significantly disrupt marine environments. The process often involves disturbing seabed habitats, leading to sediment resuspension and habitat degradation. Such disturbances can have cascading effects on benthic organisms and the broader marine food web. Additionally, the electromagnetic fields (EMFs) emitted by these cables may interfere with the navigation and communication of sensitive marine species, potentially altering their natural behaviors.

Furthermore, Hawaiʻi already has multiple existing fiber-optic cables in place, connecting the islands and linking Hawaiʻi to the rest of the world. Rather than laying new cables that will further disrupt the ocean floor, the state should focus on upgrading, repairing, or repurposing the infrastructure that already exists. Why disturb more of Kanaloa when viable alternatives exist?

The Kā Paʻakai framework requires a thorough analysis of the cultural and environmental impacts on Native Hawaiian practices and resources. This project, which involves digging into the ocean floor and laying industrial infrastructure in our sacred waters, directly violates our rights to access, protect, and sustain the marine resources that have nurtured us for generations. The proposed activities threaten the delicate ecosystems that sustain our fisheries, impact traditional gathering practices, and contribute to the ongoing desecration of Kanaloa, an act that goes against everything our kupuna have taught us about mālama ʻāina.

Instead of investing in the destruction of our marine environments, the $300 million in federal funding should be directed toward areas of greater need; such as improving last-mile infrastructure to directly benefit underserved communities, enhancing existing collaborations, and removing old, unused cables that continue to litter the ocean floor. This would reflect a true commitment to sustainability rather than the unnecessary expansion of damaging infrastructure.

The government and corporate entities pushing for this fiber link must be held accountable for the irreversible damage they intend to inflict on our ocean. Alternative solutions must be sought; ones that do not sacrifice the health of our waters and marine life for the sake of technological advancement.

I urge decision makers to uphold their duty to protect the rights of Native Hawaiians and our environment. Reject any proposal that disregards the cultural, spiritual, and ecological significance of Kanaloa. Our ocean is not an expendable commodity; it is our home, our history, and our future.

Me ka ʻoiaʻiʻo,
Teave H Heen
808-870-7656
teave@hawaii.edu

APPENDIX J
PRE-ASSESSMENT SCOPING LETTER

Hawaiian Islands Fiber Link

April 7, 2025

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation Request for Hawai‘i Revised Statutes (HRS) Chapter 343 Environmental Assessment; Multiple Islands and TMKs (see attachment)**

Dear Interested Party,

The State of Hawai‘i, represented by the University of Hawai‘i (UH) Vice President for Information Technology and Chief Information Officer (VPIT), is proposing the Hawaiian Islands Fiber Link (HIFL) Project, an interisland submarine fiber optic cable system intended to improve and expand high-speed internet (broadband) access and availability across the state. Leveraging federal investment in technological infrastructure, the prospective interisland cable system would address a key component of the state's *Connect Kākou* broadband initiative to ensure reliable and affordable access to high-speed internet for communities throughout the state. To assist with obtaining the necessary permits for the project, UH has engaged Ocean Networks Inc. (ONI), a private company specializing in the development, operation, and maintenance of submarine fiber optic cables.

The proposed project involves construction, operation, and maintenance of an interisland subsea fiber optic cable system with cable landing sites strategically located on Kaua‘i (Nukoli‘i Beach), O‘ahu (Barbers Point), Maui (Kahului Harbor), Moloka‘i (Moloka‘i Yacht Club), Lāna‘i (Mānele Harbor) and Hawai‘i Island (Pacific Aquaculture & Coastal Resource Center, Hilo). The cable, which would have a maximum diameter of approximately 1.1 inches, would be surface-laid on the seabed within state and U.S. federal waters to interconnect these sites. At all six cable landing sites, horizontal directional drilling (HDD) would be used to traverse underneath the shoreline to respective offshore punchout locations in the nearshore waters. Facilities on each island would include a beach manhole, terrestrial fiber optic cable, and a cable landing station with associated cable termination and monitoring equipment. Additional detail regarding the proposed project and location maps are attached; information is also available on the project website (https://www.hifl.llc/).

Pursuant to the requirements of Hawai‘i Revised Statutes (HRS) Chapter 343 and Hawai‘i Administrative Rules (HAR) Section 11-200.1, an Environmental Assessment (EA) is being prepared to evaluate the potential environmental effects of the proposed project. As part of the environmental review process, pre-assessment consultation is being conducted to obtain input on the scope of issues to be considered in the Draft EA. We are requesting input, including concerns related to particular environmental resources, as well as other relevant information that should be considered in evaluation of the proposed project.

Please provide your comments regarding the scope of the EA in writing via the U.S. Postal Service or e-mail to the addresses listed below. Comments must be postmarked by May 9, 2025 to be considered in preparation of the Draft EA.

Lisa Kettley, Tetra Tech Inc.
RE: Hawaiian Islands Fiber Link Project
737 Bishop Street, Suite 2000
Honolulu, Hawai‘i 96813

OR

info@hifl.llc

Thank you for your participation in the environmental review process for this proposed project.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

Attachments

- Hawaiian Islands Fiber Link Project Summary
- Tax Map Keys (TMKs) Within Project Study Area
- Project Location Figures

Background

In recent years, high-speed internet (broadband) has emerged as critical infrastructure for functions including business and economic development, educational advancement, health care, social and civic engagement, governmental and public services, and national security. Fiber optic cable systems, which utilize lasers to transmit data signals through protected fiber optic strands, provide much higher total bandwidth than other technologies, and are currently the most robust and feasible method for high-speed transmission and distribution of data. In the State of Hawai'i, most of the broadband connectivity to and between the islands is provided via submarine fiber optic cable systems. However, there has been a lack of investment in this infrastructure, resulting in limited and aging assets which provide the critical link between the global internet and Hawai'i's residents. In addition to approaching retirement age, the existing systems also no longer meet the current and future bandwidth demands associated with digital streaming and cloud technology.

Project Purpose

The purpose of the Hawaiian Islands Fiber Link (HIFL) Project is to develop an interisland fiber optic cable system to provide robust and reliable broadband access and availability across the State of Hawai'i. Specifically, the project would involve construction, operation, and maintenance of an interisland fiber optic cable system that would distribute high-speed broadband to the six main Hawaiian Islands, with associated cable landing sites on Kaua'i, O'ahu, Maui, Lāna'i, Moloka'i and Hawai'i Island.

The Project would address a key component of the state's *Connect Kākou* broadband initiative, a statewide plan for infrastructural investments to ensure that all of Hawai'i's residents have access to robust and reliable broadband service. The strategic framework guiding this plan identifies four investment pillars: (1) Governance and Sustainability, (2) Middle Mile, (3) Last Mile, and (4) Access, Equity, and Literacy.[1] The *Connect Kākou* initiative seeks to leverage federal funding granted for middle mile and last mile infrastructure in Hawai'i, which totals more than $300 million dollars to date. The HIFL Project would specifically address the middle mile infrastructure; other components of the initiative are being addressed separately.

Project Description

The HIFL Project would include both marine and terrestrial components, with the marine component comprising approximately 416 miles of submarine fiber optic cable surface-laid on the seabed between the islands. The cable would have a maximum diameter of approximately 1.1 inches, with the deepest cables having a diameter about the width of a typical household garden hose (0.6 inches). The cable would be installed in five distinct segments spanning the nearshore state waters and surrounding U.S. federal waters (see Figure 1).

[1] Standard terminology used to discuss telecommunications infrastructure includes "first mile", "middle mile", and "last mile". In the case of Hawai'i, "first mile" refers to trans-Pacific cables connecting Hawai'i to the global internet. "Middle mile" refers to the connections between islands (i.e., subsea cables linking the islands) as well as high-volume terrestrial connections, which provides the foundation for delivery of broadband to consumers. "Last mile" refers to the terrestrial connections between middle mile infrastructure and residences, businesses and other end-users.

At all six cable landing sites, horizontal directional drilling (HDD) would be used to traverse underneath the shoreline to respective offshore punchout locations in the nearshore waters. The terrestrial components at each cable landing site would include a beach manhole (BMH), terrestrial fiber optic cable (terrestrial cable), and a cable landing station (CLS). The BMH would be a below-ground reinforced concrete vault (or similar) where the subsea cable would terminate. Terrestrial cable would connect with the subsea cable in the BMH and extend onward to the CLS, either via underground conduit and/or existing utility infrastructure. On Kauaʻi, Oʻahu, Molokaʻi and Hawaiʻi Island, the HIFL system would utilize fiber on the existing utility systems serving those islands (e.g., those owned and operated by the local electric and/or telecommunications companies).[2]

With exception of Lanaʻi, each CLS would be located on University of Hawaiʻi (UH) property, either as a new modular structure or within an existing building. The CLS would house the equipment needed to support subsea cable transmission and monitoring, as well as facilitate interconnection with the local telecommunications network. The six proposed cable landing sites are summarized in the following table; additional information regarding each cable landing site is provided in the following sections.

Summary of Cable Landing Sites

Island	Cable Landing Site	Route Segment	Shoreline Crossing Method	Cable Landing Station
Kauaʻi	Nukoliʻi Beach	Segment 1	HDD	UH Kauaʻi Community College
Oʻahu	Barbers Point Beach Park	Segment 1/2	HDD	UH West Oʻahu / DR Fortress
Molokaʻi	Molokaʻi Yacht Club	Segment 2A	HDD	UH Maui College, Molokaʻi Education Center
Lānaʻi	Mānele Harbor	Segment 2B	HDD	Adjacent to Mānele Harbor
Maui	Kahului Harbor	Segment 2/3	HDD	UH Maui College
Hawaiʻi	Pacific Aquaculture & Coastal Resource Center (PACRC), Hilo	Segment 3	HDD	UH Hilo, School of Education Center

The HIFL Project is being proposed by the University of Hawaii (UH) Vice President for Information Technology and Chief Information Officer (VPIT), with support from the Research Corporation of the University of Hawaiʻi (RCUH). In addition, the UH VPIT has engaged Ocean Networks, Inc. (ONI), a private company specializing in the development, operations, and maintenance of submarine cables, to obtain the required permits for the Project. Once installed, the HIFL system is expected to have an operational life of at least 25 years. The Project infrastructure would be maintained for the duration of the operating period; at the end of its design life, the Project infrastructure would be retired.

[2] These facilities would not be analyzed as part of the proposed Project because they comprise existing third-party utility infrastructure but are generally described to provide context for the proposed Project.

Cable Landing Sites

Nukoli‘i Beach (Kaua‘i)

The proposed cable landing site on the island of Kaua‘i is located at Nukoli‘i Beach, an undeveloped beach park accessed via Kaua‘i Beach Road, just north of Hanamā‘ulu (see Figure 2.1). This site would include a single HDD conduit, extending approximately 4,595 feet from a BMH to the nearshore waters punchout point at a water depth of approximately 70 feet. The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be sited in an undeveloped portion of the beach park, near the existing bathroom facilities. From the BMH, the terrestrial cable would be installed in new underground conduit located along Kaua‘i Beach Road and Kaua‘i Beach Drive, terminating at a manhole near the intersection with Kūhiō Highway. From this point, the Project would utilize fiber owned by a licensed utility as part of their existing utility network, generally following a route along Kūhiō Highway and Kaumuali‘i Highway to Kaua‘i Community College. Space within an existing building on the Kaua‘i Community College campus would be used as the CLS for this cable landing. Trenching or similar ground disturbance may be required at Kaua‘i Community College to deliver power to the CLS.

Barbers Point Beach (O‘ahu)

The proposed O‘ahu cable landing site is located at Barbers Point Beach Park, in Kalaeloa on the southwest side of O‘ahu (see Figure 2.2). This site would require two HDD conduits – one extending approximately 4,500 feet from a BMH to the nearshore waters punchout point for the cable connecting to Kaua‘i (Segment 1), and the other extending approximately 5,200 feet from a BMH to the nearshore waters punchout point for the cable connecting to Maui (Segment 2). The punchout points would be at water depths of approximately 60 feet and 65 feet, respectively. The BMHs and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be located in an undeveloped portion of the beach park, near the existing bathroom facilities. At the BMHs, the subsea cables would each be spliced to a terrestrial cable, which would be installed in new underground conduit to a manhole located next to an existing utility pole at the end of Olai Street. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, generally following a route along county and state roadways to DR Fortress in central Honolulu. Space within an existing building at DR Fortress would be used as the CLS for this cable landing. En route, the fiber would also connect to the UH West O‘ahu campus, with space in an existing building used as a HIFL access point.

Moloka‘i Yacht Club (Moloka‘i)

The proposed Moloka‘i cable landing site is located just west of Kaunakakai Harbor in an area used by the Moloka‘i Yacht Club on the south side of the island (see Figure 2.3). This site would include a single HDD conduit, extending approximately 1,000 feet from a BMH to the nearshore waters punchout point at a water depth of approximately 3 feet. The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be sited in an undeveloped area adjacent to the yacht club facilities. From the BMH, terrestrial cable would be installed in an underground conduit extending to a manhole sited next to an existing utility pole adjacent to Mauna Loa Highway. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, including the overhead system along Mauna Loa / Kamehameha V Highway as well as existing underground conduit extending into the Moloka‘i Education Center. New terrestrial cable would be installed in underground conduit from the Moloka‘i Education Center to the CLS, which would be a new modular structure located on the property of the Moloka‘i Education Center.

Mānele Harbor (Lānaʻi)

The proposed cable landing site on Lānaʻi is located at the Mānele Small Boat Harbor on the south side of the island (see Figure 2.4). This site would include a single HDD conduit, extending approximately 870 feet from a BMH to the nearshore waters punchout point at a water depth of approximately 23 feet. The BMH and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be sited in the southern-most parking lot for the small boat harbor. From the BMH, the terrestrial cable would be installed in trenched conduit to a new CLS located on undeveloped land immediately adjacent to the harbor. Additional underground conduit would be installed from the CLS to nearby manhole(s) to connect the Project with the existing telecommunication and utility network.

Kahului Harbor (Maui)

The proposed cable landing site on the island of Maui is located at Kahului Harbor, on the north side of Central Maui (see Figure 2.5). The Project would require two HDD conduits at this site – one extending approximately 1,360 feet from a BMH to the nearshore waters punchout point for the cable extending to Oʻahu (Segment 2), and the other extending approximately 3,375 feet from the same BMH to the nearshore waters punchout point for the cable extending to Hawaiʻi Island (Segment 3). These punchout points would be at water depths of approximately 30 feet and 42 feet, respectively. In addition to the two HDD conduits for the Project, a third HDD conduit would be installed for future subsea cable use; this HDD would extend approximately 1,360 feet from a separate BMH to the nearshore waters punchout point at a water depth of approximately 30 feet. The BMHs and associated work areas (e.g., temporary drilling operations area, staging area, etc.) would be located within an undeveloped area on the western harbor breakwater. At the BMH, the subsea cables would each be spliced to a terrestrial cable, which would be installed underground in new conduit extending from the western breakwater, under and along Kahului Beach Road and Wahinepio Avenue. The underground conduit would terminate at the CLS, consisting of a new modular structure in the area currently used for the recycling center on the northwestern edge of the UH Maui College campus. Additional underground conduit would be installed from the CLS to an adjacent building on the UH Maui College campus to connect the Project with the exiting telecommunication and utility network.

Pacific Aquaculture & Coastal Resource Center, Hilo (Hawaiʻi Island)

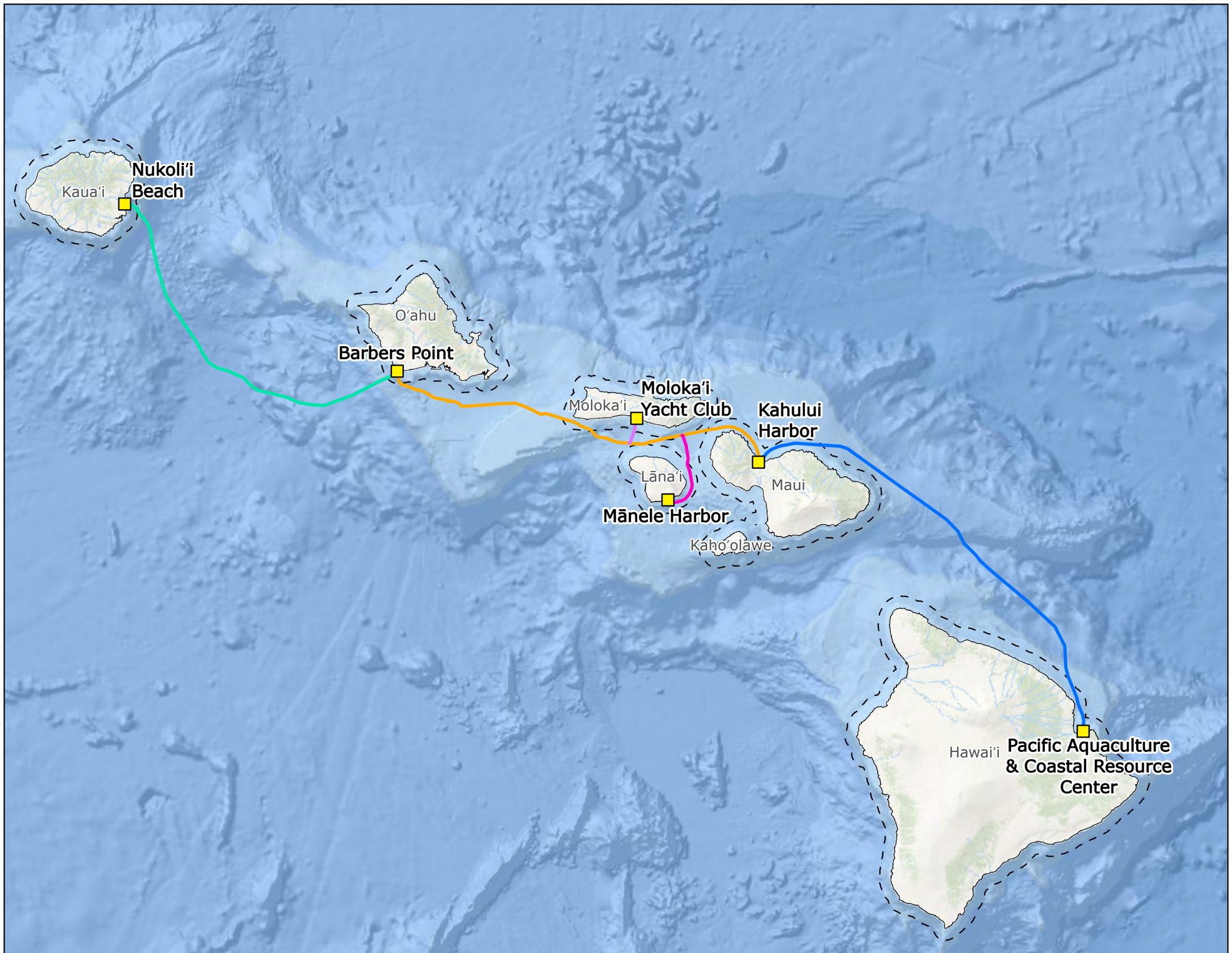
The proposed Hilo cable landing site is located at the Pacific Aquaculture and Coastal Resource Center (PACRC), just east of the Hilo Harbor breakwater on the east side of Hawaiʻi Island (see Figure 2.6). Given the presence of buried wastewater utility pipes in the immediate vicinity of the cable landing, the HDD conduit would be specifically sited to facilitate crossing of the wastewater utility pipes, surfacing in shallow water just seaward of the shoreline. Beyond this point, the cable would be surface-laid on the ocean floor; split pipe would be installed over approximately 3,600 feet of cable to provide additional protection and minimize movement due to wave energy in the nearshore waters. From the BMH, the terrestrial cable would be installed in underground conduit to a manhole installed adjacent to a nearby utility pole. From this point, the Project would utilize fiber owned by a licensed utility as part of the existing utility network, extending along state and county roadways as well as via existing underground conduit, terminating at the UH Hilo campus. The CLS for this site would be a new modular structure constructed on the northern side of the UH Hilo campus near Lanikāula Street. Additional underground conduit would be installed from the CLS to an adjacent building on the UH Hilo campus to connect the Project with the exiting telecommunication and utility network.

Tax Map Keys (TMKs) Within Project Study Area

Tax Map Key	Landowner
Nukoli'i Beach (Kaua'i)[1]	
(4) 3-7-003:007	Garden Isle Dream LLC
(4) 3-7-003:017	Kauai Beach Resort Assoc; Knickerbocker Life Ins Co; Walter T Shimoda; and Nancy Shimoda
(4) 3-7-003:999	Kuhio Highway (State ROW)
(4) 3-4-007:003	University of Hawai'i
Barbers Point (O'ahu)[1]	
(1) 9-1-026:027	City and County of Honolulu
None	Olai Road (County ROW)
(1) 9-1-016:220	University of Hawai'i
(1) 1-1-015:013	Loyalty Development Co Ltd (leased to DR Fortress LLC)
Moloka'i Yacht Club (Moloka'i)[1]	
(2) 5-3-001:011	State of Hawai'i
(2) 5-3-001:003	County of Maui
(2) 5-3-999:999	Kamehameha V Hwy (State ROW)
(2) 5-3-003:999	Alanui Kaimike St (County ROW)
(2) 5-3-003:014	University of Hawai'i
(2) 5-3-003:013	University of Hawai'i
Mānele Harbor (Lāna'i)	
(2) 4-9-017:002	Lanai Resorts LLC
(2) 4-9-017:006	State of Hawai'i (Division of Boating and Ocean Recreation [DOBOR] via Executive Order)
(2) 4-9-017:027	State of Hawai'i
Kahului Harbor (Maui)	
(2) 3-7-001:022	State of Hawai'i (Department of Transportation Harbors Division via Executive Order)
(2) 3-7-001:021	State of Hawai'i (Department of Transportation via Executive Order)
(2) 3-7-001:999	Kahului Beach Road (State ROW)
(2) 3-8-007:001	County of Maui (leased to Maui Nui Botanical Gardens Inc.)
(2) 3-8-007:127	County of Maui
(2) 3-8-007:999	Wahinepio Avenue (County ROW)
(2) 3-8-007:125	University of Hawai'i
(2) 3-8-007:040	University of Hawai'i
Pacific Aquaculture & Coastal Resource Center, Hilo (Hawai'i Island)[1]	
(3) 2-1-011:005	Department of Hawaiian Homelands (DHHL)
(3) 2-1-011:010	State of Hawai'i (County of Hawai'i via Executive Order)
(3) 2-1-011:004	University of Hawai'i
(3) 2-1-009:001	State of Hawai'i (University of Hawai'i via Executive Order)
(3) 2-4-056:017	State of Hawai'i
(3) 2-4-001:167	State of Hawai'i

NOTES:

[1] These sites would utilize fiber owned by a licensed utility company as part of their existing utility network. The anticipated route for this cable is generally described herein but may be subject to refinement by the licensed utility. These facilities would not be analyzed as part of the proposed Project because they comprise existing third-party infrastructure but are generally described to provide context for the proposed Project.



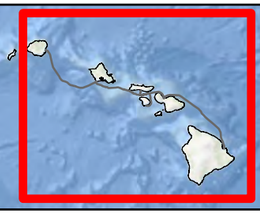
Hawaiian Islands Fiber Link

Figure 1
Project Overview

- Cable Landing Site
- State Waters Limits (3 nautical miles)

Subsea Cable

- Segment 1
- Segment 2
- Segment 2A
- Segment 2B
- Segment 3



0 20 40 80 120
Kilometers

0 12.5 25 50
Nautical Miles

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 03/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: UTM Zone 4 (Transverse Mercator)

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\EA_ScopingLetter_20250312\ONI_HIFL_EA_ScopingLetter_20250312.aprx

Hawaiian Islands Fiber Link

Figure 2.1
Cable Landing Site:
Nukoli'i Beach, Kaua'i



Detailed Map Extent A



Detailed Map Extent B

Terrestrial Study Area

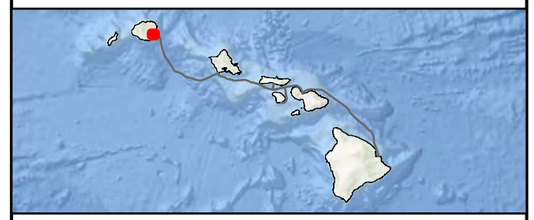
TMK Parcel

Proposed Project Infrastructure

- Beach Manhole
- Seabed Punchout Point
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 1)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System



0 0.5 1 1.5 2
Kilometers

0 2,000 4,000
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 04/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 4 (FIPS 5104)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\MapsIEA_ScopingLetter_20250312\ONI_HIFL_EA_ScopingLetter_20250404.aprx

Hawaiian Islands Fiber Link

Figure 2.2
Cable Landing Site:
Barbers Point, Oʻahu



Detailed Map Extent

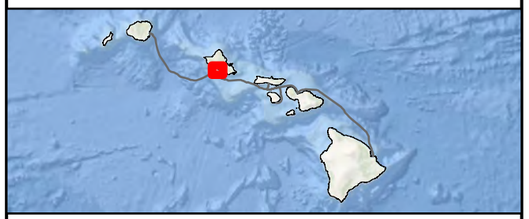
- Terrestrial Study Area
- TMK Parcel

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- HIFL Access Point
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 1)
- Subsea Cable (Segment 2)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System



0 1 2 3 4
Kilometers

0 5,000 10,000
Feet

N
W E
S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 04/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 3 (FIPS 5103)

Not for Construction

Document Path: \\cess706gisfs1\CES\Projects\PDX\OceanNetworksIncHawaiian_Islands_Fiber_Link\Maps\EA_ScopingLetter_20250312\ONI_HIFL_EA_ScopingLetter_20250404.aprx

Hawaiian Islands Fiber Link

Figure 2.3
Cable Landing Site:
Molokaʻi Yacht Club, Molokaʻi



Terrestrial Study Area

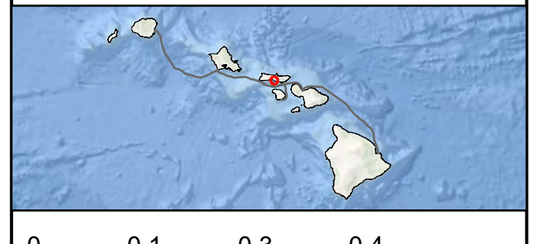
TMK Parcel

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Transition Between New Underground Conduit and Existing Utility System
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2A)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System



0 0.1 0.3 0.4
Kilometers

0 680 1,360
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 04/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\EA_ScopingLetter_20250312\ONI_HIFL_EA_ScopingLetter_20250404.aprx



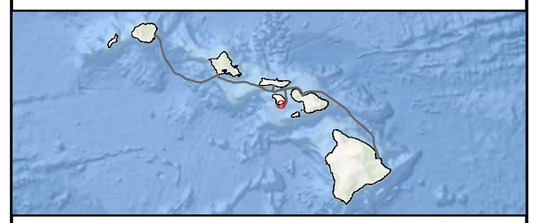
Hawaiian Islands Fiber Link

Figure 2.4
Cable Landing Site: Mānele Harbor, Lāna'i

- Terrestrial Study Area
- TMK Parcel

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2B)
- Terrestrial Cable (Underground Conduit)



0 0.1 0.1 0.2
Kilometers

0 260 520
Feet

N W E S

Prepared For: Ocean Networks

Prepared By: TETRA TECH

Date: 04/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\EA_ScopingLetter_20250312\ONI_HIFL_EA_ScopingLetter_20250404.aprx



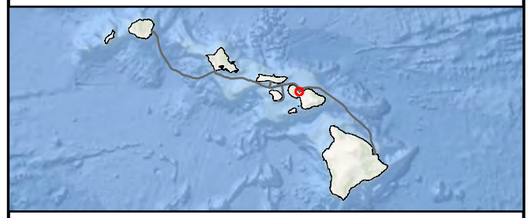
Hawaiian Islands Fiber Link

Figure 2.5
Cable Landing Site:
Kahului Harbor Breakwater, Maui

- Terrestrial Study Area
- TMK Parcel

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Cable Landing Station
- Borehole
- Subsea Cable (Segment 2)
- Subsea Cable (Segment 3)
- Borehole for Future Subsea Cable
- Terrestrial Cable (Underground Conduit)



0 0.1 0.3 0.4
Kilometers

0 680 1,360
Feet

N W E S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 04/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 2 (FIPS 5102)

Not for Construction

Document Path: \\cess706gisfs1\CESIProjects\PDX\OceanNetworksIncHawaiian_Islands_Fiber_Link\Maps\EA_ScopingLetter_20250312\ONI_HIFL_EA_ScopingLetter_20250404.aprx

Hawaiian Islands Fiber Link

Figure 2.6
Cable Landing Site:
Hilo, Hawai'i Island



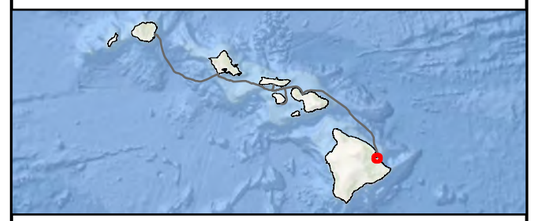
- Terrestrial Study Area
- TMK Parcel

Proposed Project Infrastructure

- Seabed Punchout Point
- Beach Manhole
- Utility Connection Point
- Cable Landing Station
- Transition Between New Underground Conduit and Existing Utility System
- Subsea Cable (Segment 3)
- Terrestrial Cable (Underground Conduit)

Third-Party Infrastructure

- Fiber Owned by Licensed Utility Company As Part of Existing Utility System



0 0.4 0.8 1.2
Kilometers

0 1,000 2,000
Feet

N
W E
S

Prepared For: OCEAN Networks

Prepared By: TETRA TECH

Date: 04/2025

Source: Hawaii Statewide GIS, USGS, Esri, et. al.,

Coordinate System: North American Datum, 1983
Projection: Hawaii State Plane Zone 1 (FIPS 5101)

Not for Construction

Document Path: \\ess706gisfs1\CES\Projects\PDX\OceanNetworksInc\Hawaiian_Islands_Fiber_Link\Maps\EA_ScopingLetter_20250312\ONI_HIFL_EA_ScopingLetter_20250404.aprx

APPENDIX K
SCOPING COMMENTS AND RESPONSES

From: Carla Kuo
To: HIFL LLC
Subject: RE: Hawaiian Islands Fiber Link Project - HRS Chapter 343 EA Scoping Request
Date: Thursday, April 10, 2025 9:32:49 AM
Attachments: image001.png

You don't often get email from exec@hicc.biz. Learn why this is important

CAUTION: This email originated from an external sender. Verify the source before opening links or attachments.

Aloha Cliff, and thank you for sharing with our Chamber.

Would you be able to share information regarding:

- Background - any track record of projects completed in Hawaii or in other states
- Who you are working with for an environmental assessment
- What community outreach has been done for the landing sites and where can the community find more information
- If this project will serve existing carriers and its customers
- An implementation timeline, maintenance schedules
- Existing funding, project costs and cost recovery
- RFP plans, if any

Mahalo,
Carla

Carla Kuo
Executive Officer

Hawai'i Island Chamber of Commerce
1321 Kino'ole Street
Hilo, HI 96720
Phone: 808-935-7178
Fax: 808-961-4435
hicc.biz
HICC on Facebook & Instagram

Hawaiian Islands Fiber Link

July 14, 2025

Ms. Carla Kuo
Hawaii Island Chamber of Commerce
1321 Kinoʻole Stree
Hilo, Hawaiʻi 96720
Sent via email: exec@hicc.biz

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawaiʻi Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Ms. Kuo,

Thank you for your email regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your questions are provided below; relevant information will also be included in the Draft Environmental Assessment (EA), as appropriate.

- Background - any track record of projects completed in Hawaii or in other states

  The Project is being proposed by the University of Hawaii (UH) Vice President for Information Technology and Chief Information Officer (VPIT). Through a competitive bidding process, UH selected Ocean Networks Inc. (ONI) to assist with key aspects of the project, including the permitting and entitlement process. ONI is a privately held telecommunications development and service company that was established in 2013 and is headquartered in Atlanta, Georgia. ONI develops submarine cable systems for carriers, content providers, governments, and research and education groups. Under its subsidiary Submarine Cable Salvage, ONI also repurposes out-of-service (OOS) submarine cable systems for ocean science. The company currently owns more than 8,000 kilometers of OOS submarine cable systems globally.

  ONI has assembled a highly experienced and differentiated management team with extensive backgrounds in the submarine cable industry, including new system development, management, operations, implementation, maintenance, permitting, marketing, sales, and finance. The ONI team has been directly involved in over 150 submarine cable system installation and repair operations over the past 30 years. Additionally, ONI has engaged a network of industry-experienced contractors to support development of the Hawaiian Islands Fiber Link (HIFL) project.

- Who you are working with for an environmental assessment

  ONI has contracted Tetra Tech to assist with the environmental review and permitting process for the HIFL project. Tetra Tech is responsible for preparing the environmental assessment (EA), with support from ONI and specialty subcontractors.

- What community outreach has been done for the landing sites and where can the community find more information

  A variety of community outreach activities have been conducted to date, including informational town hall meetings on each island. Outreach efforts will continue through the permitting and construction process, with multiple opportunities for stakeholder input and feedback. Additional information regarding the project, as well as notices regarding future engagement opportunities, are posted on the project website (www.hifl.llc). A summary of community outreach to date and planned outreach moving forward will also be included in the Draft EA.

- If this project will serve existing carriers and its customers

  The HIFL system would be the only open-access and carrier-neutral interisland submarine cable system in Hawai'i and will serve the various carriers.

- An implementation timeline, maintenance schedules

  An implementation timeline and discussion of maintenance procedures will be included in the Draft EA.

- Existing funding, project costs and cost recovery

  A discussion of the project's funding, costs, and cost recovery will be included in the Draft EA.

- RFP plans, if any

  Contracts for the horizontal directional drilling (HDD) and civil construction as well as the wet plant manufacturing components of the project have been awarded. An RFP has been issued for the marine installation, dry plant, and cable landing station (CLS) construction components.

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

From: Gregg M. Okamoto
To: info@hifl.llc
Subject: HI Islands Fiber Link Project EA
Date: Tuesday, April 15, 2025 4:21:08 PM
Attachments: 01222025-OceanNetworks-OnePager-R4.pdf

You don't often get email from gregg.okamoto@mpd.net. Learn why this is important

CAUTION: This email originated from an external sender. Verify the source before opening links or attachments.

Aloha Cliff,

We do not have any input to offer for the EA. However, one question is will fiber connections be provided between Maui, Molokai, and Lanai to form a loop for our connectivity needs? Also, has consideration been made for a segment of this fiber to go into East Maui as existing underground fiber from Central Maui offers limited connectivity.

In addition, we may have to consider if the project will be impacted by traffic and if the project will impact traffic. Please let me know if you have any additional questions.

Gregg Okamoto
Assistant Chief of Police
Maui Police Department
55 Mahalani Street
Wailuku, HI 96793
Desk: (808)244-6415 | Cell: (808)264-9786

Hawaiian Islands Fiber Link

July 14, 2025

Assistant Chief Gregg Okamoto
Maui Police Department
55 Mahalani Street
Wailuku, HI 96793
Sent via email: Gregg.Okamoto@mpd.net

Subject: Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment

Dear Assistant Chief Okamoto,

Thank you for your email regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your questions are provided below; this information will also be included in the Draft Environmental Assessment (EA) as appropriate.

- Will fiber connections be provided between Maui, Molokai, and Lanai to form a loop for our connectivity needs?

  The proposed HIFL fiber optic cable system would interconnect and distribute broadband to the six main Hawaiian Islands, including Maui, Moloka'i, and Lana'i.

- Also, has consideration been made for a segment of this fiber to go into East Maui as existing underground fiber from Central Maui offers limited connectivity.

  As middle mile infrastructure, the HIFL system would distribute broadband to each of the six main Hawaiian Islands. Connectivity to the individual communities on each island, including East Maui, is delivered via last-mile infrastructure. By providing more robust middle-mile infrastructure, the HIFL system would expand the broadband capacity available for last-mile delivery to individual communities (including those in East Maui). In addition to existing last-mile infrastructure, new last-mile infrastructure is also being pursued (by others); more information on these efforts is available through the state's Connect Kakou website (www.connectkakou.org).

- In addition, we may have to consider if the project will be impacted by traffic and if the project will impact traffic.

  The Draft EA will address potential traffic-related impacts. We will advise you as to when the Draft EA will be available for public review and will welcome your comments at that time.

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

RICHARD T. BISSEN, JR.
Mayor

JOSIAH K. NISHITA
Managing Director

PATRICK S. MCCALL
Director

SHANE T. DUDOIT
Deputy Director

DEPARTMENT OF PARKS AND RECREATION
COUNTY OF MAUI
700 HALI'A NAKOA STREET, UNIT 2
WAILUKU, MAUI, HAWAI'I 96793
www.mauicounty.gov

April 15, 2025

Lisa Kettley
Tetra Tech, Inc.
737 Bishop Street, Suite 2000
Honolulu, HI 96813

Dear Ms. Kettley:

SUBJECT: HAWAIIAN ISLANDS FIBER LINK (HIFL) PROJECT; PRE-ASSESSMENT CONSULTATION REQUEST FOR HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT; MĀNELE HARBOR, LĀNA'I, HAWAI'I AND KAHULUI HARBOR, KAHULUI, MAUI, HAWAI'I; MULTIPLE TMKS

Thank you for the opportunity to review and comment on the subject project. The Department of Parks and Recreation has no comment at this time.

Should you have any questions, please feel free to contact me or Samual Marvel, Chief of Planning and Development, at samual.marvel@co.maui.hi.us or (808) 270-6173.

Sincerely,

PATRICK S. MCCALL
Director of Parks and Recreation

c: Samual Marvel, Chief of Planning and Development

PSM:SAM:gh

Hawaiian Islands Fiber Link

July 14, 2025

Mr. Patrick McCall
County of Maui Department of Parks and Recreation
700 Hali'a Nakoa Street, Unit 2
Wailuku, Hawai'i 96793

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Mr. McCall,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate your interest in the Project and response to the pre-assessment consultation request. We understand you have no comment at this time but will keep you apprised of the Project status and the availability of the Draft Environmental Assessment (EA) for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

C. Kimo Alameda, Ph.D.
Mayor

William V. Brilhante Jr.
Managing Director

Benjamin T. Moszkowicz
Police Chief

Reed K. Mahuna
Deputy Police Chief

County of Hawai`i

POLICE DEPARTMENT

349 Kapi'olani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-2389

April 19, 2025

Ms. Lisa Kettley
Tetra Tech Inc.
737 Bishop Street, Suite 2000
Honolulu, Hawaii 96813

Dear Ms. Kettley:

SUBJECT: HAWAIIAN ISLANDS FIBER LINK (HIFL) PROJECT; PRE-ASSEMENT OF CONSULTATION REQUEST FOR HAWAII REVISED STATUTES (HRS) CHAPTER 343 ENVIRONMENTAL ASSESSMENT; MULTIPLE ISLANDS AND TMKS

Upon reviewing the provided documents, the Hawaii Police Department does not anticipate any significant impact on traffic and/or public safety concerns.

Thank you for allowing us the opportunity to comment.

If you have any questions, please contact our South Hilo District Commander, Captain Aaron Carvalho, at (808) 961-2316 or via email at aaron.carvalho@hawaiicounty.gov.

Sincerely,

For

KENNETH A.K. QUIOCHO
ASSISTANT POLICE CHIEF

Hawaiian Islands Fiber Link

July 14, 2025

Kenneth Quiocho, Assistant Police Chief
County of Hawaii Police Department
359 Kapiolani Street
Hilo, Hawaii 96720

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Assistant Chief Quiocho,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Based on your response, we understand that you do not anticipate the project will significantly impact traffic and/or public safety. We will keep you apprised of the Project status and the availability of the Draft Environmental Assessment (EA) for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

From: DOH.CABPASS
To: info@hifl.llc
Subject: CAB Comments: Hawaiian Islands Fiber Link Project
Date: Tuesday, April 22, 2025 4:15:57 PM

You don't often get email from doh.cabpass@doh.hawaii.gov. Learn why this is important

CAUTION: This email originated from an external sender. Verify the source before opening links or attachments.

To Lisa Kettley,
Tetra Tech Inc,

Thank you for the opportunity to review the Hawaiian Islands Fiber Link Project – HRS Chapter 343 EA Scoping Request (pre-assessment) emailed to the Clean Air Branch (CAB) on April 8, 2025. Please go to the Clean Air Branch (CAB) website to download and utilize our Standard Comments for Land Use Reviews. The link is included below.

Clean Air Branch | Standard Comments for Land Use Reviews

Sincerely,

Katt

Katt Marshall | she*/her*
Planner I | Clean Air Branch | Planning & Administrative Support Staff (PASS)
Hawai'i State Department of Health | Ka 'Oihana Olakino
2827 Waimano Home Road #130 | Pearl City, Hawaii 96782
Office: (808) 586-4200

CONFIDENTIALITY NOTICE: This mail message (and attachments) is for the sole use of the intended recipient(s). It may contain confidential and/or privileged information. It might also be protected from disclosure under the Hawaii Uniform Information Practice Act (UIPA) or other laws and regulations. Review, use, disclosure, or distribution by unintended recipients is prohibited. If you are not the intended recipient, please contact the sender immediately in a separate e-mail and destroy the original message and any copies.

July 14, 2025

Ms. Katt Marshall
Hawai'i State Department of Health
Clean Air Branch
2827 Waimano Home Road #130
Pearl City, Hawai'i 96782

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Ms. Marshall,

Thank you for your email regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. We acknowledge the Clean Air Branch's standard comments for land use reviews and will incorporate this information into the Draft Environmental Assessment (EA) as appropriate. We will continue to keep you apprised of the Project status and availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

JOSH GREEN, M.D.
GOVERNOR
KE KIA'ĀINA

KEITH A. REGAN
COMPTROLLER
KA LUNA HO'OMALU HANA LAULĀ

MEOH-LENG SILLIMAN
DEPUTY COMPTROLLER
KA HOPE LUNA HO'OMALU HANA LAULĀ

STATE OF HAWAI'I | KA MOKU'ĀINA O HAWAI'I
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES | KA 'OIHANA LOIHELU A LAWELAWE LAULĀ
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)25.062

APR 2 2 2025

Lisa Kettley
Tetra Tech, Inc.
737 Bishop Street, Suite 2000
Honolulu, Hawaii 96813

Dear Lisa Kettley:

Subject: Hawaiian Islands Fiber Link Project
Pre-Assessment Consultation Request for
Hawaii Revised Statutes Chapter 343 Environmental Assessment
Multiple Islands and TMKs

Thank you for the opportunity to provide comments for the subject project. We have no comments to offer at this time, as the subject project in its various locations does not appear to directly impact any of the Department of Accounting and General Services' projects or facilities.

If you have any questions, your staff may call Dennis Chen of the Planning Branch at (808) 586-0491, or e-mail him at dennis.yk.chen@hawaii.gov.

DE:va

Sincerely,

GORDON S. WOOD
Public Works Administrator

Hawaiian Islands Fiber Link

July 14, 2025

Mr. Gordon Wood
State of Hawaii Department of Accounting and General Services
P.O. Box 119
Honolulu, Hawaii 96810

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Mr. Wood,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Based on your response, we understand that you do not have any comments at this time as the project is not expected to impact on any Department of Accounting and General Services projects or facilities. We will continue to keep you apprised of the Project status and the availability of the Draft Environmental Assessment (EA) for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

DEPARTMENT OF PARKS AND RECREATION
KA 'OIHANA MĀLAMA PĀKA A ME NĀ HANA HO'ONANEA
CITY AND COUNTY OF HONOLULU

1000 ULU'ŌHI'A STREET, SUITE 309 • KAPOLEI, HAWAI'I 96707
PHONE: (808) 768-3003 • FAX: (808) 768-3053 • WEBSITE: honolulu.gov/parks

RICK BLANGIARDI
MAYOR
MEIA

LAURA H THIELEN
DIRECTOR
PO'O

EDWARD "TED" HAYDEN
DEPUTY DIRECTOR
HOPE PO'O

April 22, 2025

Ms. Lisa Kettley
Tetra Tech Inc.
737 Bishop Street, Suite 2000
Honolulu, Hawai'i 96813

Re: Hawaiian Islands Fiber Link (HIFL) Project Pre-Assessment Consultation Request for Hawai'i Revised Statutes Chapter 343 Environmental Assessment

Dear Ms. Kettley:

Thank you for your letter dated April 7, 2025, regarding the above-mentioned project. One of HIFL's proposed cable landing sites is Barber's Point Beach Park, which is owned and operated by the Department of Parks and Recreation (DPR).

The project proposes locating two subsea cables, two beach manholes and a terrestrial cable within park property.

We have been in communication with Brungardt Advisory Services, LLC which, with various partners, is requesting a grant of easement for the installation of underground facilities at Barber's Pont Beach Pak as part of their Oahu Subsea Cable Project (OSCP). It is our understanding that the HIFL project and OSCP project will be utilizing the same landing pipes and beach manholes. DPR agrees with the sharing of infrastructure to minimize impacts to Barber's Point Beach Park.

However, the HIFL's proposed terrestrial cable appears to be a sperate infrastructure development, separate of the OSCP project. The terrestrial cable is not within the easement area that the OSCP project is working towards with the City. It is unclear if the cable will be underground or ariel. If underground, DPR does not agree with the location of the cable as it appears to go under an existing parking lot and may impact trees on the property. DPR prefers, where possible, that all fiberoptic projects share the same infrastructure and easement areas.

DPR requests a meeting with the HIFL project team to better understand the project's impacts to Barber's Point Beach Park including which infrastructure will be shared between the two fiberoptic projects. DPR would also like further clarification regarding what land dispositions HIFL will be seeking for use of Barber's Point Beach Park.

Please contact Jennifer Barra, Planner at (808) 768-3017 or via email at jennifer.barra@honolulu.gov, to set up a meeting at your earliest convenience.

Sincerely,

Laura H Thielen
Director

cc: Tammy Namihira, Department of Budget and Fiscal Services
Catherine Taschner, Department of Land Management

(938156)

Hawaiian Islands Fiber Link

July 14, 2025

Ms. Laura Thielen
City and County of Honolulu Department of Parks and Recreation
1000 Ulu‘ohi‘a Street, Suite 309
Kapolei, Hawai‘i 96707

Subject: Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai‘i Revised Statutes (HRS) Chapter 343 Environmental Assessment

Dear Ms. Thielen,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your questions are provided below; this information will also be included in the Draft Environmental Assessment (EA), as appropriate.

- We have been in communication with Brungardt Advisory Services, LLC which, with various partners, is requesting a grant of easement for the installation of underground facilities at Barber's Point Beach Park as part of their Oahu Subsea Cable Project (OSCP). It is our understanding that the HIFL project and OSCP project will be utilizing the same landing pipes and beach manholes. DPR agrees with the sharing of infrastructure to minimize impacts to Barber's Point Beach Park.

  However, the HIFL's proposed terrestrial cable appears to be a separate infrastructure development, separate of the OSCP project. The terrestrial cable is not within the easement area that the OSCP project is working towards with the City. It is unclear if the cable will be underground or ariel. If underground, DPR does not agree with the location of the cable as it appears to go under an existing parking lot and may impact trees on the property. DPR prefers, where possible, that all fiberoptic projects share the same infrastructure and easement areas."

  The Oahu Subsea Cable Project (OSCP) and Hawaiian Island Fiber Link (HIFL) Project are similar but unrelated projects with independent purpose and utility (i.e. first-mile and middle-mile broadband infrastructure, respectively). However, these two projects are being coordinated to maximize synergies and capitalize on the use of shared infrastructure to the extent practicable; shared infrastructure is likely to include the cable landing boreholes and beach manholes. In addition to this shared infrastructure, HIFL would also require terrestrial cable infrastructure within Barbers Point Beach Park to facilitate interconnection with the island's existing telecommunications network. Detailed coordination between HIFL and OSCP is ongoing to refine the proposed location of this infrastructure with the intent of minimizing impacts to existing features associated with the beach park facility.

- DPR requests a meeting with the HIFL project team to better understand the project's impacts to Barber's Point Beach Park including which infrastructure will be shared between the two fiberoptic projects. DPR would also like further clarification regarding what land dispositions HIFL will be seeking for use of Barber's Point Beach Park.

  We acknowledge the importance of communicating with DPR regarding the HIFL project, the requested land dispositions, and potential impacts to Barbers Point Beach Park. Based on recent confirmation of the strategy for shared infrastructure and refinement of the terrestrial cable alignment in coordination with OSCP, we met and shared relevant information with DPR staff on June 24, 2025. We appreciate the feedback provided and look forward to continuing to work with DPR staff as the project progresses.

Thank you for your interest in the HIFL Project. We will continue to keep you apprised of the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

From:	Castillo, Carlos
To:	info@HIFL.llc
Cc:	Liu, Rouen
Subject:	Pre-Assessment Consultation Response – Environmental Assessment - Hawaiian Islands Fiber Link (HIFL) Project – Statewide
Date:	Thursday, April 24, 2025 4:56:30 PM
Attachments:	image002.png image003.png image004.png image005.png image006.png image007.png image008.png

CAUTION: This email originated from an external sender. Verify the source before opening links or attachments.

Dear Project Team,

Thank you for the opportunity to participate in the pre-assessment consultation process for the Hawaiian Islands Fiber Link (HIFL) Project. Hawaiian Electric Company appreciates being included in the early stages of this significant statewide infrastructure initiative.

We understand that the HIFL Project, led by the University of Hawai‘i in partnership with Ocean Networks Inc., aims to improve broadband access and resiliency across the Hawaiian Islands by constructing and operating an interisland fiber optic cable system with landings on Kaua‘i, O‘ahu, Maui, Moloka‘i, Lāna‘i, and Hawai‘i Island. The project involves horizontal directional drilling, new beach manholes, terrestrial cable, and cable landing stations, which highlights the importance of early coordination with utility providers.

Given that the terrestrial fiber infrastructure will utilize existing utility systems—some of which are owned or operated by Hawaiian Electric—particularly on O‘ahu, Maui, and Hawai‘i Island, we respectfully request ongoing coordination to ensure that project activities are compatible with Hawaiian Electric’s facilities and operations. This includes potential trenching near existing poles, access to easements, and connections within or near our service corridors.

At this time, Hawaiian Electric has no objections to the proposed scope of work as described. However, due to the multiple island sites and the involvement of critical infrastructure, we recommend continued coordination as design and permitting advances, particularly regarding:

- Site-specific interface with existing electrical infrastructure
- Access and construction near utility rights-of-way
- Power delivery to proposed cable landing stations (CLS), especially new modular structures

Please continue to keep Hawaiian Electric informed as the Environmental Assessment is developed. Should direct coordination be required, feel free to contact me at (808) 285-6284.

Sincerely,
Carlos Castillo (WA3 – PTA)
Permits Planner
Hawaiian Electric Company
PO Box 2750
Honolulu, HI 96840-0001

Carlos Castillo
Permits Planner, T&D Engineering

C: 808.285.6284
Carlos.castillo@hawaiianelectric.com

Hawaiian Electric
PO Box 2750, Honolulu, HI 96840





CONFIDENTIALITY NOTICE: This e-mail message, including any attachments, is for the sole use of the intended recipient(s) and may contain confidential and/or privileged information. Any unauthorized review, use, copying, disclosure or distribution is prohibited. If you are not the intended recipient, please contact the sender immediately by reply e-mail and destroy the original message and all copies.

Hawaiian Islands Fiber Link

July 14, 2025

Mr. Carlos Castillo
Hawaiian Electric Company
P.O Box 2750
Honolulu, Hawaii 96840

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Mr. Castillo,

Thank you for your email regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your input are provided below; relevant information will also be included in the Draft Environmental Assessment (EA) as appropriate.

- Request ongoing coordination to ensure that project activities are compatible with Hawaiian Electric's facilities and operations. This includes potential trenching near existing poles, access to easements, and connections within or near our service corridors.

  At this time, Hawaiian Electric has no objections to the proposed scope of work as described. However, due to the multiple island sites and the involvement of critical infrastructure, we recommend continued coordination as design and permitting advances, particularly regarding:
  - Site-specific interface with existing electrical infrastructure
  - Access and construction near utility rights-of-way
  - Power delivery to proposed cable landing stations (CLS), especially new modular structures

  ONI began coordinating with Hawaiian Electric Company early in the project development process and is committed to continued coordination throughout the permitting and construction process, especially as related to the interface with Hawaiian Electric's existing infrastructure, access and construction near utility rights-of-way, and power delivery to the new CLS facilities. The results of this coordination will be reflected in the Draft EA, as appropriate.

We appreciate your interest in the HIFL Project. We will keep you apprised of the Project status will advise you as to when the Draft EA will be available for review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

From: Garrett, Nathan C
To: info@hifl.llc
Subject: RE: [EXTERNAL] Hawaiian Islands Fiber Link Project - HRS Chapter 343 EA Scoping Request
Date: Monday, April 28, 2025 8:27:18 AM
Attachments: image001.png

You don't often get email from nathan.c.garrett@hawaii.gov. Learn why this is important

CAUTION: This email originated from an external sender. Verify the source before opening links or attachments.

Hello!

This is Nathan from the IT Dept at HIEMA. We got your email and supporting documents, thank you! We are located in Diamond Head crater, so we aren't in the path of any of the cable landing sites, but if you need anything, we'll be standing by.

Thank you!

Nathan Garrett
Sr. Systems Analyst (IT)
Hawaii Emergency Management Agency
4204 Diamond Head Road
Honolulu, HI 96816
Nathan.c.garrett@hawaii.gov
Office: 808-733-4300 Ext.512
Cell: 808-445-0039

July 14, 2025

Mr. Nathan Garrett
Hawaii Emergency Management Agency
4204 Diamond Head Road
Honolulu, Hawaii 96816
Sent via email: Nathan.c.garrett@hawaii.gov

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Mr. Garrett,

Thank you for your email regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate your response and interest in the Project. We will keep you apprised of the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

From: Pham, Olivia N
To: info@hifl.llc
Cc: Mahaulu, Daverney Gioia K
Subject: HIFL Pre-Assessment Consultation Request for HRS 343
Date: Tuesday, April 29, 2025 11:39:19 AM
Attachments: 25.0146 Ocean Networks - Cmnts to Tetra Tech re Scope of EA for HIFL Proj.pdf

You don't often get email from olivia.n.pham@hawaii.gov. Learn why this is important

CAUTION: This email originated from an external sender. Verify the source before opening links or attachments.

Good afternoon,

Please see compiled comments from HDOT Harbors below:

- The site landing occurs on Harbor Property, HawaiianLink's designers will need to submit engineered plan drawing details to Harbors for the Horizontal Directionally Drilled Borehole alignment and conduit jackets that traverse through West-Kahului breakwater area, when they proceed with engineering designs.

- Additionally, Tax Map Key No (2) 3-7-001:021 is under the control and management jurisdiction of HDOT Harbors, therefore please coordinate with HDOT Harbors' Property Management section to secure all necessary land dispositions required.

- HDOT Harbors must be consulted on the final design in order for HDOT Harbors to coordinate project construction with Maui Harbor districted so as not to conflict with any storage or cargo or other harbor related matters.

Thank you,
Olivia Pham
Harbors Property Manager
808-587-1942

Hawaiian Islands Fiber Link

July 14, 2025

Ms. Olivia Pham
State of Hawaii Department of Transportation
Harbors Division
Sent via email: Olivia.n.pham@hawaii.gov

Subject: Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment

Dear Ms. Pham,

Thank you for your email regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your comments are provided below; relevant information will also be included in the Draft Environmental Assessment (EA) as appropriate.

- The site landing occurs on Harbor Property, Hawaiian Link's designers will need to submit engineered plan drawing details to Harbors for the Horizontal Directionally Drilled Borehole alignment and conduit jackets that traverse through West-Kahului breakwater area, when they proceed with engineering designs.

  Preliminary consultation was conducted with the State of Hawai'i Department of Transportation (HDOT) to share conceptual information regarding the HIFL Project. We acknowledge the need to share more detailed design information and plan to submit engineering drawings for the horizontal directional drilling (HDD) borehole alignment and related components that traverse the western breakwater of Kahului Harbor.

- Additionally, Tax Map Key No (2) 3-7-001:021 is under the control and management jurisdiction of HDOT Harbors, therefore please coordinate with HDOT Harbors' Property Management section to secure all necessary land dispositions required.

  In addition to submitting detailed engineering drawings, we also acknowledge the need to coordinate with HDOT's Property Management section to secure all necessary land dispositions.

- HDOT Harbors must be consulted on the final design in order for HDOT Harbors to coordinate project construction with Maui Harbor districted so as not to conflict with any storage or cargo or other harbor related matters.

We understand the importance and are committed to continued consultation with HDOT Harbors Division through the construction phase to avoid any conflicts with other harbor uses and activities.

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
Office of Conservation and Coastal Lands
P.O. BOX 621
HONOLULU, HAWAII 96809

DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RYAN K.P. KANAKA'OLE
FIRST DEPUTY

CIARA W.K. KAHAHANE
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF:OCCL:AA

Correspondence: ST 25-170

Apr 29, 2025

Lisa Kettley
Tetra Tech Inc.
737 Bishop Street, Suite 2000
Honolulu, Hawai'i 96813

SUBJECT: Pre-Consultation for the Hawaiian Island Fiber Link Project Environmental Assessment located at Honouliuli, Ewa, O'ahu TMK: (1) 9-1-026:027, Kaunakakai, Moloka'i TMK: (2) 5-3-001:003 & 011, Island of Lāna'i, District of Lāhainā, Maui TMK: (2) 4-9-017:006, Kahului, Maui TMK: (2) 3-7-001:021 & 022, Keaukaha, Waiakea, South Hilo, Hawai'i TMK: (3) 2-1-011:005, & Hanamā'ulu, Līhu'e, Kaua'i TMK: (4) 3-7-003:017

Dear Lisa Kettley,

The Office of Conservation and Coastal Lands (OCCL) has reviewed the above noted Statewide project. According to your letter, the State of Hawai'i, represented by the University of Hawai'i Vice President for Information Technology and Chief Information Officer (VPIT), is proposing the Hawaiian Islands Fiber Link (HIFL) project. The portions of this project that lie within the Conservation District are in the Protective, Limited, & Resource subzones.

The HIFL project is an interisland submarine fiber optic cable system intended to improve and expand high-speed internet access and availability across the State. The proposed project would include both marine and terrestrial components, with the marine component comprising approximately 416 miles of submarine fiber optic cable surface-laid on the seabed between the islands. The cable would have a maximum diameter of approximately 1.1 inches, with the deepest cables having a diameter about the width of a typical household garden hose. The cable would be installed in five distinct segments spanning the nearshore state waters and surrounding U.S. federal waters. Once installed, the HIFL system is expected to have an operational life span of at least 25 years.

The OCCL regulates land uses in the State Land Use Conservation District which includes areas that lie three miles makai of the shoreline through the issuance of Site Plan Approvals (SPAs) and Conservation District Use Permits (CDUPs).

Based on the provided information, the project appears to be an identified land use that may be applied for in the Conservation District pursuant to Hawai'i Administrative Rules (HAR) §13-5-22, P-6, PUBLIC PURPOSE USES *Not for profit land uses undertaken in support of a public service*

by an agency of the county, state, or federal government, or by an independent non-governmental entity, except that an independent non-governmental regulated public utility may be considered to be engaged in public purpose use. Examples of public purpose uses may include but are not limited to public roads, marinas, harbors, airports, trails, water systems and other utilities, energy generation from renewable sources, communication systems, floor or erosion control projects, recreational facilities, community centers, and other public purpose uses, intended to benefit the public in accordance with public policy and the purpose of the conservation district.

This would require the submittal of a Conservation District Use Application (CDUA) for a Board Permit and related attachments such as a Final Environmental Assessment. To allow, modify, or deny the project would be at the Board of Land and Natural Resources discretion. The project should comply with the provision of Hawai'i's Coastal Zone Management law (HRS Chapter 205A) that pertains to the Special Management Area (SMA) requirements administered by the various counties. Further, §13-5-40 Hearings. *(a) Public hearings shall be held: (1) On all applications for a proposed use of land for commercial purposes.*

Regarding broadband-related permits, pursuant to Hawai'i Revised Statutes (HRS) 27-45 (b) *the State shall approve, approve with modification, or disapprove use applications for broadband facilities within the conservation district within one hundred forty-five days of submission of a complete application and full payment of any applicable fee.*

The rules and regulations of the Conservation District, noted as Chapter 13-5 can be obtained from our website at https://dlnr.hawaii.gov/occl/. Should you have any questions, contact Alyssa Accardo of our office at (808) 587-0048 or at alyssa.m.accardo@hawaii.gov.

Sincerely,

S Michael Cain

S. Michael Cain, Administrator
Office of Conservation and Coastal Lands

CC: Land Division
City and County of Honolulu, DPP
County of Maui, Hawai'i, Kaua'i, DPP

July 14, 2025

Mr. Michael Cain
Office of Conservation and Coastal Lands
P.O. Box 621
Honolulu, Hawaii 96809

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai‘i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Mr. Cain,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your comments are provided below; this information will also be included in the Draft Environmental Assessment (EA) as appropriate.

- The portions of this project that lie within the Conservation District are in the Protective, Limited, & Resource subzones.

  We appreciate confirmation of the applicable Conservation District subzones within which the project falls.

- Based on the provided information, the project appears to be an identified land use that may be applied for in the Conservation District pursuant to Hawai'i Administrative Rules (HAR) §13-5-22, P-6, PUBLIC PURPOSE USES Not for profit land uses undertaken in support of a public service by an agency of the county, state, or federal government, or by an independent nongovernmental entity, except that an independent non-governmental regulated public utility may be considered to be engaged in public purpose use. Examples of public purpose uses may include but are not limited to public roads, marinas, harbors, airports, trails, water systems and other utilities, energy generation from renewable sources, communication systems, floor or erosion control projects, recreational facilities, community centers, and other public purpose uses, intended to benefit the public in accordance with public policy and the purpose of the conservation district. This would require the submittal of a Conservation District Use Application (CDUA) for a Board Permit and related attachments such as a Final Environmental Assessment. To allow, modify, or deny the project would be at the Board of Land and Natural Resources discretion. The project should comply with the provision of Hawai'i's Coastal Zone Management law (HRS Chapter 205A) that pertains to the Special Management Area (SMA) requirements administered by the

various counties. Further, §13-5-40 Hearings. (a) Public hearings shall be held: (1) On all applications for a proposed use of land for commercial purposes."

Thank you for confirming that the project is an identified land use within the Conservation District (P-6, PUBLIC PURPOSE USES) and identifying the applicable requirements, including a Conservation District Use Application, a Final Environmental Assessment, compliance with HRS Chapter 205A, and the need for a public hearing. We look forward to working with the Office of Conservation and Coastal Lands staff in pursuit of these requirements.

- Regarding broadband-related permits, pursuant to Hawai'i Revised Statutes (HRS) 27-45 (b) the State shall approve, approve with modification, or disapprove use applications for broadband facilities within the conservation district within one hundred forty-five days of submission of a complete application and full payment of any applicable fee.

  Thank you for identifying the applicable regulations regarding the permitting process for broadband projects.

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

HONOLULU FIRE DEPARTMENT
KA 'OIHANA KINAI AHI O HONOLULU
CITY AND COUNTY OF HONOLULU

636 SOUTH STREET • HONOLULU, HAWAI'I 96813
PHONE: (808) 723-7139 • FAX: (808) 723-7111 • WEBSITE: honolulu.gov

RICK BLANGIARDI
MAYOR
MEIA

SHELDON K. HAO
FIRE CHIEF
LUNA NUI KINAI AHI

JASON SAMALA
DEPUTY FIRE CHIEF
HOPE LUNA NUI KINAI AHI

April 24, 2025

Ms. Lisa Kettley
Tetra Tech Inc.
737 Bishop Street, Suite 2000
Honolulu, Hawai'i 96813

Dear Ms. Kettley:

Subject: Hawaiian Islands Fiber Link Project; Preassessment Consultation Request

In response to your letter received on April 10, 2025, regarding the abovementioned subject, the Honolulu Fire Department reviewed the submitted information and has no comments at this time.

Should you have questions, please contact Acting Battalion Chief Kaulana Kama of our Fire Prevention Bureau at 808-723-7152 or hfdfpb1@honolulu.gov.

Sincerely,

PAO-CHI HWANG
Acting Assistant Chief

PH/MD:sk

cc: Mr. Clifford Miyake, Chief Strategy Officer

Hawaiian Islands Fiber Link

July 14, 2025

Mr. Pao-Chi Hwang
Honolulu Fire Department
636 South Street
Honolulu, Hawaii 96813

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Assistant Chief Hwang,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review the information and understand that you have no comments at this time. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

From: Casey, Matthew C CIV (USA)
To: info@hifl.llc
Cc: Shimabukuro, Joshua S CIV (USA); Laycock, Anthony J CIV USCG CEU HONO (USA)
Subject: Hawaiian Islands Fiber Link Project
Date: Monday, May 5, 2025 12:11:26 PM

You don't often get email from matthew.c.casey@uscg.mil. Learn why this is important

CAUTION: This email originated from an external sender. Verify the source before opening links or attachments.

Aloha – In response to the pre-assessment consultation request for the Hawaiian Islands Fiber Link (HIFL) Project Environmental Assessment (EA), the USCG Civil Engineering Unit (CEU) Honolulu offers the following comment:

1. The proposed cable landing sites on the islands of Hawaii, Oahu, Lanai, Maui, and Molokai are within the vicinity of active USCG Aids to Navigation (ATON) (i.e. harbor range lights and associated equipment). The USCG requests confirmation that ATON structures and equipment shall not be obstructed or utilized as part of the HIFL project.

V/r,

Matthew C. Casey
Environmental Branch Chief
U.S. Coast Guard
Civil Engineering Unit Honolulu
(206) 820-3967

Hawaiian Islands Fiber Link

July 14, 2025

Mr. Matthew Casey
U.S. Coast Guard
Civil Engineering Unit Honolulu
Sent via email: matthew.c.casey@uscg.mil

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Mr. Casey,

Thank you for your email regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your comments are provided below.

- The proposed cable landing sites on the islands of Hawaii, Oahu, Lanai, Maui, and Molokai are within the vicinity of active USCG Aids to Navigation (ATON) (i.e. harbor range lights and associated equipment). The USCG requests confirmation that ATON structures and equipment shall not be obstructed or utilized as part of the HIFL project.

  The location of existing Aids to Navigation (ATON) was considered in the initial site selection and routing study, and as part of subsequent design refinement. The Project would not utilize any existing ATON structures and is specifically designed to avoid obstruction or other impacts to these structures. A discussion detailing the avoidance of existing ATON structures will be provided in the Draft Environmental Assessment (EA).

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

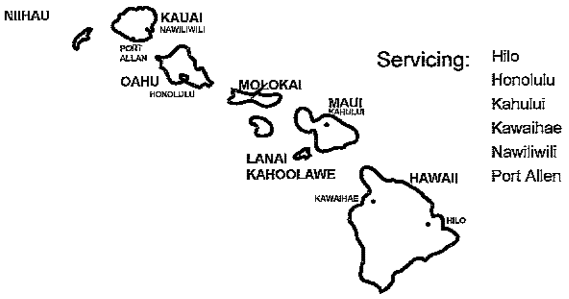
Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

HAWAII PILOTS ASSOCIATION

P.O. Box 721 • Honolulu, Hawaii 96808

Telephone: (808) 532-7233



May 7, 2025

Dear Ms. Lisa Kettley,

The location of the subsea cable outside of Kahului Harbor and in the entrance channel for Kahului harbor poses serious concerns for the safe marine navigation of vessels transiting to / from this harbor, which often experiences 25 -30 knot NE winds in addition to being exposed to large Northerly winter swells. The proposed subsea cable in this area crosses the entrance channel for Kahului Harbor and if an inbound / outbound ship has a mechanical failure (loss of propulsion, loss of steering, etc) in the entrance channel, the dropping of the ship's anchor to possibly assist in preventing the vessel from running aground, there is a very good chance that the ship's anchor could snag or damage the proposed subsea cable. Not to mention if the transiting vessel accidentally drops an anchor on its approach to the harbor or departure from the harbor, this dropped anchor could also get entangle with the proposed subsea cable.

Additionally, it must be noted that this harbor is a very busy interisland barge discharge & loading port. Often in one day, Kahului Harbor may have up to three different ocean-going tugs towing three different barges bringing a variety of commodities to this island. These inter island ocean going tugs towing these large barges will often drag their tow wires, chain bridles / pendants very near to the ocean bottom on the approach to the harbor or when departing the harbor, and there is a very good chance their tow equipment could ensnare the proposed subsea cable.

Thank you very much for your consideration on this matter.

Best regards,

Captain Sinclair Brown, President
Hawaii Pilots Association

July 14, 2025

Captain Sinclair Brown
Hawaii Pilots Association
P.O. Box 721
Honolulu, Hawaii 96808

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Captain Brown,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your comments are provided below; this information will also be included in the Draft Environmental Assessment (EA) as appropriate.

- The location of the subsea cable outside of Kahului Harbor and in the entrance channel for Kahului harbor poses serious concerns for the safe marine navigation of vessels transiting to / from this harbor, which often experiences 25 -30 knot NE winds in addition to being exposed to large Northerly winter swells. The proposed subsea cable in this area crosses the entrance channel for Kahului Harbor and if an inbound / outbound ship has a mechanical failure (loss of propulsion, loss of steering, etc) in the entrance channel, the dropping of the ship's anchor to possibly assist in preventing the vessel from running aground, there is a very good chance that the ship's anchor could snag or damage the proposed subsea cable. Not to mention if the transiting vessel accidentally drops an anchor on its approach to the harbor or departure from the harbor, this dropped anchor could also get entangle with the proposed subsea cable.

  Additionally, it must be noted that this harbor is a very busy interisland barge discharge & loading port. Often in one day, Kahului Harbor may have up to three different ocean-going tugs towing three different barges bringing a variety of commodities to this island. These inter island ocean going tugs towing these large barges will often drag their tow wires, chain bridles / pendants very near to the ocean bottom on the approach to the harbor or when departing the harbor, and there is a very good chance their tow equipment could ensnare the proposed subsea cable.

  Marine vessel navigation was a key consideration in the initial site selection and routing study for the Project, and the cable route design was developed based on detailed marine vessel navigational data (Marine Cadastre 2024 AIS Vessel Transit Counts). Based on these data, the

cable segment that traverses the entrance channel to Kahului Harbor would be buried deeply below the recommended entrance route to the harbor via underground conduit installed using horizontal directional drilling (HDD). Specifically, the cable would be more than 40 feet deep for approximately 750 linear feet where it crosses the recommended entrance route, transitioning to a depth of approximately 10 feet below the seabed before punching out at the eastern end of the traffic boundary area. Articulated split pipe would be installed to provide additional protection beyond this boundary. In addition to these specific design considerations, Project implementation would include a Cable Awareness Program which would include close coordination with the Hawaii Pilots Association. Additional details regarding the cable routing and avoidance of impacts to marine vessel navigation will be included in the Draft EA.

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

May 8, 2025

Tetra Tech, Inc.
Clifford Miyake
c/o Lisa Kettley
Re: Hawaiian Islands Fiber Link Project
737 Bishop Street, Suite 2000
Honolulu, Hawai'i 96813

via email: info@hifl.llc

SUBJECT: Pre-Assessment Consultation Request for the Hawaiian Islands Fiber Link Project (HIFL) Multiple Islands and TMKs Statewide

Dear Mr. Miyake,

Thank you for the opportunity to review and comment on the subject matter. The Land Division of the Department of Land and Natural Resources (DLNR) distributed or made available a copy of your request pertaining to the subject matter to DLNR's Divisions for their review and comment.

Please find enclosed comments from the following divisions: the Land Division – O'ahu, the Land Division – Hawai'i Island, Engineering, and the Division of Boating and Ocean Recreation, on the subject matter. Should you have any questions, please feel free to contact Dayna Vierra at (808) 587-0423 or email: dayna.k.vierra@hawaii.gov.

Sincerely,

Ian Hirokawa
Acting Land Administrator

Enclosure(s)

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

April 24, 2025

MEMORANDUM

TO: **DLNR Agencies:**
_X_ Div. of Aquatic Resources (kendall.l.tucker@hawaii.gov)
_X_ Div. of Boating & Ocean Recreation (richard.t.howard@hawaii.gov)
_X_ Engineering Division (DLNR.ENGR@hawaii.gov)
_X_ Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
_X_ Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
_X_ Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
_X_ Land Division – Hawaii District (candace.m.martin@hawaii.gov)
_X_ Land Division – Kaua'i District (alison.neustein@hawaii.gov)
_X_ Land Division – Maui District (dlnr.land.maui@hawaii.gov)
_X_ Land Division – O'ahu District (barry.w.cheung@hawaii.gov)
_X_ Land Division – Ian C. Hirokawa (ian.c.hirokawa@hawaii.gov)
_X_ Land Division – Rebecca L. Anderson (rebecca.l.anderson@hawaii.gov)
_X_ Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

FROM: FOR Russell Y. Tsuji, Land Administrator
SUBJECT: **Pre-Assessment Consultation Request for the Hawaiian Islands Fiber Link Project (HIFL)**
LOCATION: Multiple Islands and TMKs (see attached)
APPLICANT: The University of Hawai'i (UH) Vice President for Information Technology and Chief Information Officer (VPIT) on behalf of the State of Hawai'i

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments to me by **May 7, 2025.**

If no response is received by this date, we will assume your agency has no comments. Should you have any questions about this request, please contact Dayna Vierra at dayna.k.vierra@hawaii.gov. Thank you.

BRIEF COMMENTS:

Any work/use of public lands, including submerged lands, would require land dispositions from the Board of Land and Natural Resources.

( ) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
(X) Comments are included/attached.

Signed: Darlene Bryant-Takamatsu
Print Name: Darlene Bryant-Takamatsu
Division: Land Division - Oahu District
Date: 4/25/2025

Attachments

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

April 24, 2025

MEMORANDUM

TO: **DLNR Agencies:**
_X_ Div. of Aquatic Resources (kendall.l.tucker@hawaii.gov)
_X_ Div. of Boating & Ocean Recreation (richard.t.howard@hawaii.gov)
_X_ Engineering Division (DLNR.ENGR@hawaii.gov)
_X_ Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
_X_ Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
_X_ Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
_X_ Land Division – Hawaii District (candace.m.martin@hawaii.gov)
_X_ Land Division – Kaua'i District (alison.neustein@hawaii.gov)
_X_ Land Division – Maui District (dlnr.land.maui@hawaii.gov)
_X_ Land Division – O'ahu District (barry.w.cheung@hawaii.gov)
_X_ Land Division – Ian C. Hirokawa (ian.c.hirokawa@hawaii.gov)
_X_ Land Division – Rebecca L. Anderson (rebecca.l.anderson@hawaii.gov)
_X_ Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

FROM: FOR Russell Y. Tsuji, Land Administrator
SUBJECT: **Pre-Assessment Consultation Request for the Hawaiian Islands Fiber Link Project (HIFL)**
LOCATION: Multiple Islands and TMKs (see attached)
APPLICANT: The University of Hawai'i (UH) Vice President for Information Technology and Chief Information Officer (VPIT) on behalf of the State of Hawai'i

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments to me by **May 7, 2025.**

If no response is received by this date, we will assume your agency has no comments. Should you have any questions about this request, please contact Dayna Vierra at dayna.k.vierra@hawaii.gov. Thank you.

BRIEF COMMENTS:

(X) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
( ) Comments are included/attached.

Signed:
Print Name: CANDACE MARTIN
Division: LAND
Date: 5/6/2025

Attachments

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

April 24, 2025

MEMORANDUM

FROM: ~~TO:~~

DLNR Agencies:
X Div. of Aquatic Resources (kendall.l.tucker@hawaii.gov)
X Div. of Boating & Ocean Recreation (richard.t.howard@hawaii.gov)
X Engineering Division (DLNR.ENGR@hawaii.gov)
X Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
X Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
X Land Division – Hawaii District (candace.m.martin@hawaii.gov)
X Land Division – Kaua'i District (alison.neustein@hawaii.gov)
X Land Division – Maui District (dlnr.land.maui@hawaii.gov)
X Land Division – O'ahu District (barry.w.cheung@hawaii.gov)
X Land Division – Ian C. Hirokawa (ian.c.hirokawa@hawaii.gov)
X Land Division – Rebecca L. Anderson (rebecca.l.anderson@hawaii.gov)
X Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

TO: ~~FROM:~~ FOR Russell Y. Tsuji, Land Administrator
SUBJECT: **Pre-Assessment Consultation Request for the Hawaiian Islands Fiber Link Project (HIFL)**
LOCATION: Multiple Islands and TMKs (see attached)
APPLICANT: The University of Hawai'i (UH) Vice President for Information Technology and Chief Information Officer (VPIT) on behalf of the State of Hawai'i

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments to me by **May 7, 2025.**

If no response is received by this date, we will assume your agency has no comments. Should you have any questions about this request, please contact Dayna Vierra at dayna.k.vierra@hawaii.gov. Thank you.

BRIEF COMMENTS:

( ) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
(✓) Comments are included/attached.

Signed:
Print Name: Dina U. Lau, Acting Chief Engineer
Division: Engineering Division
Date: May 5, 2025

Attachments

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji

Ref: Pre-Assessment Consultation Request for the Hawaiian Islands Fiber Link Project (HIFL)
Location: Multiple Islands
TMK(s): Various
Applicant: The University of Hawaii (UH) Vice President for Information Technology and Chief Information Officer (VPIT) on behalf of the State of Hawaii

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR, Chapter 1, Subchapter B, part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM). The official FIRMs can be accessed through FEMA's Map Service Center (msc.fema.gov). Our Flood Hazard Assessment Tool (FHAT) (fhat.hawaii.gov) could also be used to research flood hazard information.

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7139.
- Kauai: County of Kauai, Department of Public Works (808) 241-4896.

Signed: _____
DINA U. LAU, ACTING CHIEF ENGINEER

Date: May 5, 2025

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

DAWN N. S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA
LAND DIVISION

P.O. BOX 621
HONOLULU, HAWAII 96809

2025 APR 25 PM 2:40
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII
LAND DIVISION

April 24, 2025

MEMORANDUM

TO: **DLNR Agencies:**
X Div. of Aquatic Resources (kendall.l.tucker@hawaii.gov)
X Div. of Boating & Ocean Recreation (richard.t.howard@hawaii.gov)
X Engineering Division (DLNR.ENGR@hawaii.gov)
X Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov)
X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov)
X Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov)
X Land Division – Hawaii District (candace.m.martin@hawaii.gov)
X Land Division – Kaua'i District (alison.neustein@hawaii.gov)
X Land Division – Maui District (dlnr.land.maui@hawaii.gov)
X Land Division – O'ahu District (barry.w.cheung@hawaii.gov)
X Land Division – Ian C. Hirokawa (ian.c.hirokawa@hawaii.gov)
X Land Division – Rebecca L. Anderson (rebecca.l.anderson@hawaii.gov)
X Aha Moku Advisory Committee (leimana.k.damate@hawaii.gov)

FROM: FOR Russell Y. Tsuji, Land Administrator
SUBJECT: **Pre-Assessment Consultation Request for the Hawaiian Islands Fiber Link Project (HIFL)**
LOCATION: Multiple Islands and TMKs (see attached)
APPLICANT: The University of Hawai'i (UH) Vice President for Information Technology and Chief Information Officer (VPIT) on behalf of the State of Hawai'i

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments to me by **May 7, 2025.**

If no response is received by this date, we will assume your agency has no comments. Should you have any questions about this request, please contact Dayna Vierra at dayna.k.vierra@hawaii.gov. Thank you.

BRIEF COMMENTS:

(X) We have no objections.
( ) We have no comments.
( ) We have no additional comments.
( ) Comments are included/attached.

Signed:
Print Name: Richard Howard
Division: DOBOR
Date: 4/25/2025

Attachments

Hawaiian Islands Fiber Link

July 14, 2025

Mr. Ian Hirokawa
State of Hawaii Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, Hawaii 96809

Subject: Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment

Dear Mr. Hirokawa,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you coordinating review with the various divisions within the Department of Land and Natural Resources (DLNR) to provide input to the environmental review scoping process. Responses to the comments provided by the various divisions of DLNR are provided below; this information will also be included in the Draft Environmental Assessment (EA) as appropriate.

Land Division - Oahu District

- Any work/use of public lands, including submerged lands, would require land disposition from the Board of Land and Natural Resources.

  We acknowledge that use of public lands, including submerged lands, requires land disposition from the Board of Land and Natural Resources. We look forward to working with the Land Division staff in pursuit of this request.

Land Division - Hawai'i District

- We have no objections.

  We acknowledge and appreciate the response.

Engineering Division (ENGR)

- The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR, Chapter 1, Subchapter B, part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM). The official FIRMs can be accessed through FEMA's Map Service Center (msc.fema.gov). Our Flood Hazard Assessment Tool (FHAT) (fhat.hawaii.gov) could also be used to research flood hazard information.

We appreciate the information regarding the National Flood Insurance Program (NFIP) and applicable regulations. We understand the need to research the Flood Hazard Zone designations for the project and will ensure the Draft EA contains relevant information.

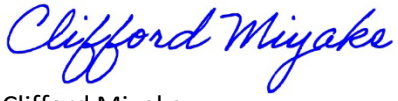
Division of Boating and Ocean Recreation (DOBOR)

- We have no objections.

  We acknowledge and appreciate the response.

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,



Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

From: Imamura, Nikki Elizabeth R
To: info@hifl.llc
Cc: Wada, Lorena
Subject: RE: Hawaiian Islands Fiber Link Project
Date: Friday, May 9, 2025 7:32:11 AM

You don't often get email from nikki_imamura@fws.gov. Learn why this is important

CAUTION: This email originated from an external sender. Verify the source before opening links or attachments.

Aloha,

My name is Nikki Imamura, and I will be the POC for the Hawaiian Islands Fiber Link Project. As we progress with the review process, we recommend generating a comprehensive species list using our iPaC (Information for Planning and Consultation) tool. A species list generated from iPaC will help to provide a current representation of federally listed species and their potential habitats within the project area. Generating this list will help us to narrow down on formulating the appropriate avoidance and minimization measures, should they be necessary for this project.

Please access iPaC to generate the species list relevant to the project area and share the compiled species list with our team for further analysis. Should you have any additional questions or concerns on this, please feel free to contact me.

Mahalo,
Nikki

Nicole R. Imamura
Fish and Wildlife Biologist | Planning and Consultation Team
Pacific Islands Fish and Wildlife Office
US Fish and Wildlife Services
300 Ala Moana Blvd Rm 3-122
Honolulu, Hawai'i 96850
(808) 460-7074

Hawaiian Islands Fiber Link

July 14, 2025

Ms. Nicole Imamura
U.S. Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Blvd Rm 3-122
Honolulu, Hawai'i 96850
Sent via email: nikki_imamura@fws.gov

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai‘i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Ms. Imamura,

Thank you for your email regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your comments are provided below; this information will also be included in the Draft Environmental Assessment (EA) as appropriate.

- As we progress with the review process, we recommend generating a comprehensive species list using our iPaC (Information for Planning and Consultation) tool. A species list generated from iPaC will help to provide a current representation of federally listed species and their potential habitats within the project area. Generating this list will help us to narrow down on formulating the appropriate avoidance and minimization measures, should they be necessary for this project. Please access iPaC to generate the species list relevant to the project area and share the compiled species list with our team for further analysis

  We appreciate the reminder regarding the U.S. Fish and Wildlife Service's Information for Planning and Consultation (iPaC) tool. A species list was generated from iPaC to prepare for the biological resource surveys conducted for the project and will be used to inform preparation of the Draft EA. We look forward to continued input and feedback from the U.S. Fish and Wildlife Service as the review process moves forward.

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

C. Kimo Alameda, Ph.D.
Mayor

William V. Brilhante, Jr.
Managing Director

West Hawai'i Office
74-5044 Ane Keohokālole Hwy
Kailua-Kona, Hawai'i 96740
Phone (808) 323-4770
Fax (808) 327-3563

County of Hawai'i
PLANNING DEPARTMENT

Jeffrey W. Darrow
Director

Michelle S. Ahn
Deputy Director

East Hawai'i Office
101 Pauahi Street, Suite 3
Hilo, Hawai'i 96720
Phone (808) 961-8288
Fax (808) 961-8742

May 9, 2025

Lisa Kettley, Tetra Tech Inc.
Re: Hawaiian Islands Fiber Link Project
737 Bishop Street, Suite 200
Honolulu, Hawai'i 96813
Email: info@hifl.llc

Dear Ms. Kettley:

SUBJECT: Pre-Assessment Consultation Request for HRS Chapter 343 Environmental Assessment (PL-ENV-2025-000038)
Project: Hawaiian Islands Fiber Link (HIFL)
Location: Multiple Locations
TMK(s): (3) 2-1-009:001, 2-4-056:017, 2-4-001:167 and 2-1-011:004, 005, 010; South Hilo District, Hawai'i

Thank you for your letter dated April 7, 2025, inviting us to participate in the early consultation process of the Draft Environmental Assessment (DEA) for the Hawaiian Islands Fiber Link Project (PL-ENV-2025-000038). We understand the project aims to build and maintain an interisland fiber optic cable system to deliver reliable, high-speed broadband to Hawai'i's six main islands as part of the state's Connect Kākou initiative. As indicated in your letter, the proposed Hilo cable landing site will route the HDD conduit to avoid existing wastewater pipes and surface just offshore, where the cable will be laid on the ocean floor with 3,600 feet of split pipe for protection. From the beach manhole, terrestrial cable will run through underground conduit to a nearby utility pole, then connect to existing licensed utility fiber extending to UH Hilo. A new modular cable landing station will be built on UH Hilo's northern campus, with additional conduit linking it to an adjacent building and the existing utility network.

The subject parcel Tax Map Key (TMK) (3) 2-1-009:001 is approximately 5.5 acres. The parcel is designated as Urban by the State Land Use Commission, the Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG) map designation is Open and is located in the Hawai'i County's Open (O) zoning district. This parcel is situated within the Special Management Area (SMA).

The subject parcel TMK (3) 2-4-056:017 is approximately 1.37 acres. The parcel is designated as Urban (U) by the State Land Use Commission, the Hawai'i County General Plan LUPAG map designation is University Use (UU), and the parcel is zoned University (UNV) by the County of Hawai'i. This parcel is not situated within the SMA.

The subject parcels Tax Map Key (TMK) (3) 2-1-011:004, 005, 010 are 3.28 acres, 9.4 acres and 0.88 acres respectively. The parcels are designated as Urban by the State Land Use Commission, the Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG) map designation is Open and is located in the Hawai'i County's Open (O) zoning district. These parcels are situated within the Special Management Area (SMA).

Based on the information provided, our recommendation is to include the following information in the Environmental Assessment (EA):

- An SMA assessment will be required, which will include a review of the cost and the overall impacts the proposed project will have on the SMA and shoreline setback area. Please describe how the proposed project aligns with the Coastal Zone Management objectives outlined in Hawai'i Revised Statutes (HRS) Chapter 205A.
- Describe how the proposed use is consistent with the Hawai'i County's General Plan.
- Refer to the Ka Pa'akai Analysis (Ka Pa'akai O Ka'Aina v. Land Use Commission, State of Hawai'i and Hawai'i State Constitution Article XII, Section 7), and identify any potential impacts to natural and cultural resources within the area, and to the exercise of Native Hawaiian traditional and customary rights, including but not limited to rights to water and culturally sensitive or significant areas. Document community engagement and actions to reasonably reduce impacts if they are found to exist.

We hope this is helpful as you move forward with drafting your environmental assessment. Please provide our department with a copy of the draft EA for our review and comment.

If you have any questions or need further assistance, please feel free to contact Shannon Arquitola at (808) 961-8137 or email shannon.arquitola@hawaiicounty.gov.

Sincerely,

Jeffrey W. Darrow
Jeffrey W. Darrow (May 9, 2025 16:13 HST)
JEFFREY W. DARROW
Planning Director

SA:ad
V:\PL\PL\planning\public\wpwin60\CH343\2025\PL-ENV-2025-000038 Hawaiian Islands Fiber Link\2025-05-09 Hawaiian Islands Fiber Link.doc

Hawaiian Islands Fiber Link

July 14, 2025

Mr. Jeffrey Darrow
County of Hawai‘i Planning Department
101 Pauahi Street, Suite 3
Hilo, Hawai‘i 96720

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai‘i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Mr. Darrow,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your comments are provided below; this information will also be included in the Draft Environmental Assessment (EA) as appropriate.

- The subject parcel Tax Map Key (TMK) (3) 2-1-009:001 is approximately 5.5 acres. The parcel is designated as Urban by the State Land Use Commission, the Hawai‘i County General Plan Land Use Pattern Allocation Guide (LUPAG) map designation is Open and is located in the Hawai‘i County's Open (0) zoning district. This parcel is situated within the Special Management Area (SMA).

  The subject parcel TMK (3) 2-4-056:017 is approximately 1.37 acres. The parcel is designated as Urban (U) by the State Land Use Commission, the Hawai‘i County General Plan LUPAG map designation is University Use (UU), and the parcel is zoned University (UNV) by the County of Hawaii. This parcel is not situated within the SMA.

  The subject parcels Tax Map Key (TMK) (3) 2-1-011: 004, 005, 010 are 3.28 acres, 9.4 acres and 0.88 acres respectively. The parcels are designated as Urban by the State Land Use Commission, the Hawai‘i County General Plan Land Use Pattern Allocation Guide (LUPAG) map designation is Open and is located in the Hawai‘i County's Open (0) zoning district. These parcels are situated within the Special Management Area (SMA). The portions of this project that lie within the Conservation District are in the Protective, Limited, & Resource subzones.

  We appreciate your assistance with confirming the state land use, Hawai‘i County General Plan LUPAG, county zoning, and SMA designations for the TMKs within the project study area. We will ensure that this information is incorporated into and properly addressed in the Draft EA.

- Based on the information provided, our recommendation is to include the following information in the Environmental Assessment (EA):
    - An SMA assessment will be required, which will include a review of the cost and the overall impacts the proposed project will have on the SMA and shoreline setback area. Please describe how the proposed project aligns with the Coastal Zone Management objectives outlined in Hawai‘i Revised Statutes (HRS) Chapter 205A.
    - Describe how the proposed use is consistent with the Hawai‘i County's General Plan.
    - Refer to the Ka Pa‘akai Analysis (Ka Pa‘akai O Ka' Aina v. Land Use Commission, State of Hawaii and Hawai‘i State Constitution Article XII, Section 7), and identify any potential impacts to natural and cultural resources within the area, and to the exercise of Native Hawaiian traditional and customary rights, including but not limited to rights to water and culturally sensitive or significant areas. Document community engagement and actions to reasonably reduce impacts if they are found to exist.

  We acknowledge the need for the Draft EA to address the project's consistency with the Coastal Zone Management objectives pursuant to HRS Chapter 205A and Hawai‘i County's General Plan, as well as the requirements associated with the Ka Pa'akai o ka ‘Āina analysis.

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

STATE OF HAWAIʻI
OFFICE OF PLANNING
& SUSTAINABLE DEVELOPMENT

JOSH GREEN, M.D.
GOVERNOR

SYLVIA LUKE
LT. GOVERNOR

MARY ALICE EVANS
DIRECTOR

235 South Beretania Street, 6th Floor, Honolulu, Hawaiʻi 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaiʻi 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824
Web: https://planning.hawaii.gov/

Coastal Zone Management Program

Environmental Review Program

Land Use Commission

Land Use Division

Special Plans Branch

State Transit-Oriented Development

Statewide Geographic Information System

Statewide Sustainability Branch

DTS202504101741HE

May 14, 2025

Ms. Lisa Kettley
Senior Planner
Tetra Tech, Inc.
737 Bishop Street, Suite 2000
Honolulu, Hawaiʻi 96813
RE: Hawaiian Islands Fiber Link Project

Dear Ms. Kettley:

Subject: Pre-Assessment Consultation Request for Hawaiʻi Revised Statutes Chapter 343 Environmental Assessment, Hawaiian Islands Fiber Link Project Multiple Island locations , State of Hawaiʻi

The State of Hawaiʻi Office of Planning and Sustainable Development (OPSD) is in receipt of your early consultation request, dated April 7, 2025, on the preparation of a Draft Environmental Assessment (Draft EA) under Hawaiʻi Revised Statutes (HRS) Chapter 343 for the Hawaiian Islands Fiber Link (HIFL) Project.

According to the early consultation material, the State of Hawaiʻi, represented by the University of Hawaiʻi (UH), is proposing the Hawaiian Islands Fiber Link (HIFL) project. HIFL is an interisland submarine fiber optic cable system intended to improve and expand high-speed broadband access to isolated communities throughout the State.

The project encompasses the construction, operation, and maintenance of an interisland subsea fiber optic cable system with cable landing sites located at: Nukoliʻi Beach, Kauaʻi; Barbers Point, Oʻahu; Kahului Harbor, Maui; Molokaʻi Yacht Club, Molokaʻi; Mānele Harbor, Lānaʻi; and the Pacific Aquaculture & Coastal Resource Center, Hilo, Hawaiʻi Island.

The OPSD has reviewed the submitted material, and has the following comments to offer:

1. <u>List of Permits and Agency Approvals/Maps & Diagrams</u>
   The Environmental Assessment (EA) shall discuss the triggers for the preparation of an EA set forth in HRS Chapter 343, as well as a list of all required permits and approvals. Furthermore, the Draft EA should contain maps of all the project locations, as well as location maps and plans of the

beach landing sites and schematic plans or drawings indicating the size, length, height, area, or footprint, depth, material to be used, and other measurements, as applicable.

2. Coastal Zone Management Act (CZMA) federal consistency
The national CZMA requires that federal actions be consistent with approved state coastal program enforceable policies. Federal actions include activities performed by a federal agency; activities that require federal permits or approvals; or state and local government projects that receive federal financial assistance. If it is deemed federal approval, such as a Department of the Army (DA) permit is required, then this project may be subject to CZMA federal consistency.

   OPSD is the lead state agency with the authority to conduct CZMA federal consistency determinations. If a federal permit is needed, please contact our office on the appliable rules and regulations related to federal consistency.

3. Hawai‘i Coastal Zone Management (CZM) Program
The CZM area is defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea" under HRS § 205A-1.

   Pursuant to HRS § 205A-4, in implementing the objectives of the CZM program, agencies shall consider ecological, cultural, historic, esthetic, recreational, scenic, open space values, coastal hazards, and economic development. As the project will require federal, state and county agency approvals, the Draft EA should include an assessment as to how the proposed project conforms to each of the CZM objectives and supporting policies set forth in HRS § 205A-2, as amended. Disclosure of impacts to CZM objectives and supporting policies, as it relates to HRS Chapter 343 requirements, will aid our office in determining impacts to the resources of the coastal zone, and evaluate the feasibility of potential mitigation measures.

4. Special Management Area (SMA) Use Permitting / Shoreline Setback Variances
The review material notes the proposed project would perform horizontal directional drilling underneath the shorelines across the multiple locations throughout the state. Please consult the respective county planning departments on any potential requirements for SMA uses and/or shoreline setback variances.

5. Water Quality, Erosion Mitigation, and the Impacts to the Nearshore Environment
Pursuant to Hawai‘i Administrative Rules (HAR) § 11-200.1-18(d)(7) – identification and analysis of impacts and alternatives considered; to ensure that nearshore coastal resources of the State of Hawai‘i remains protected, the Draft EA should include, but are not limited to, analysis on the vulnerability to shoreline erosion of the various beach landing sites, impacts to marine biota and aquatic life, as well as potential degradation of coastal water quality due to construction and operation of the HIFL system.

The Draft EA should include mitigation measures for the protection of the nearshore coastal ecosystem and the maintenance of water quality, pursuant to HAR § 11-200.1-18(d)(8).

If you have any questions or concerns, please contact Joshua Hekekia at (808) 587-2846 or by email to Joshua.K.Hekekia@hawaii.gov. If you wish to respond to this comment letter, please include DTS202504101741HE in the subject line.

Sincerely,

Mary Alice Evans

Mary Alice Evans,
Director

Hawaiian Islands Fiber Link

July 14, 2025

Ms. Mary Alice Evans
State of Hawai'i Office of Planning & Sustainable Development
235 South Beretania Street, 6th Floor
Honolulu, Hawai'i 96813

Subject: Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment

Dear Ms. Evans,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your comments are provided below; this information will also be included in the Draft Environmental Assessment (EA) as appropriate.

1. List of Permits and Agency Approvals/Maps & Diagrams
   The Environmental Assessment (EA) shall discuss the triggers for the preparation of an EA set forth in HRS Chapter 343, as well as a list of all required permits and approvals. Furthermore, the Draft EA should contain maps of all the project locations, as well as location maps and plans of the beach landing sites and schematic plans or drawings indicating the size, length, height, area, or footprint, depth, material to be used, and other measurements, as applicable.

   The Draft EA will include a discussion regarding the triggers for compliance with HRS Chapter 343, as well as a list of all required permits and approvals. The Draft EA will also contain maps of each cable landing site, along with schematic drawings of all proposed Project components.

2. Coastal Zone Management Act (CZMA) federal consistency
   The national CZMA requires that federal actions be consistent with approved state coastal program enforceable policies. Federal actions include activities performed by a federal agency; activities that require federal permits or approvals; or state and local government projects that receive federal financial assistance. If it is deemed federal approval, such as a Department of the Army (DA) permit is required, then this project may be subject to CZMA federal consistency. OPSD is the lead state agency with the authority to conduct CZMA federal consistency determinations. If a federal permit is needed, please contact our office on the appliable rules and regulations related to federal consistency.

   We acknowledge that the project is subject to Coastal Zone Management Act (CZMA) federal consistency requirements (given the need for federal approval from the U.S. Army Corps of Engineers) and plan to engage the Office of Planning and Sustainable Development to obtain a federal consistency determination.

3. Hawai'i Coastal Zone Management (CZM) Program
   The CZM area is defined as "all lands of the State and the area extending seaward from the

shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea" under HRS § 205A-1. Pursuant to HRS § 205A-4, in implementing the objectives of the CZM program, agencies shall consider ecological, cultural, historic, esthetic, recreational, scenic, open space values, coastal hazards, and economic development. As the project will require federal, state and county agency approvals, the Draft EA should include an assessment as to how the proposed project conforms to each of the CZM objectives and supporting policies set forth in HRS § 205A-2, as amended. Disclosure of impacts to CZM objectives and supporting policies, as it relates to HRS Chapter 343 requirements, will aid our office in determining impacts to the resources of the coastal zone, and evaluate the feasibility of potential mitigation measures.

The Draft EA will include an assessment of the Project's consistency with the CZM program objective and supporting policies pursuant to HRS Chapter 205A-2.

4. Special Management Area (SMA) Use Permitting / Shoreline Setback Variances
The review material notes the proposed project would perform horizontal directional drilling underneath the shorelines across the multiple locations throughout the state. Please consult the respective county planning departments on any potential requirements for SMA uses and/or shoreline setback variances.

   The project team has conducted early consultation with the respective county planning departments and will continue to engage with these departments regarding the SMA and shoreline setback variance requirements. These requirements will be summarized in the Draft EA and subsequently pursued as part of the permitting process for the project.

5. Water Quality, Erosion Mitigation, and the Impacts to the Nearshore Environment
Pursuant to Hawai'i Administrative Rules (HAR) § 11-200.1-18(d)(7) – identification and analysis of impacts and alternatives considered; to ensure that nearshore coastal resources of the State of Hawai'i remains protected, the Draft EA should include, but are not limited to, analysis on the vulnerability to shoreline erosion of the various beach landing sites, impacts to marine biota and aquatic life, as well as potential degradation of coastal water quality due to construction and operation of the HIFL system. The Draft EA should include mitigation measures for the protection of the nearshore coastal ecosystem and the maintenance of water quality, pursuant to HAR § 11-200.1-18(d)(8).

   The Draft EA will include a detailed discussion of the potential impacts and mitigation measures associated with construction and operation of the proposed HIFL system, including but not limited to shoreline erosion, marine biota and aquatic life, and coastal water quality pursuant to HAR Section 11-200.1-18(d).

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

STATE OF HAWAII | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA 'OIHANA KUMUWAIWAI 'ĀINA

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

DAWN N.S CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RYAN K.P. KANAKA'OLE
FIRST DEPUTY

CIARA W.K. KAHAHANE
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

May 07, 2025

IN REPLY REFER TO:
Project No: 2025PR00544
Doc No: 2505HCB01
History & Culture

Lisa Kettley
Tetra Tech, Inc.
737 Bishop Street, Suite 2000
Honolulu, HI 96813
info@hifl.llc

Aloha e Ms. Kettley,

SUBJECT: Hawai'i Revised Statues (HRS) Chapter 343 Draft Environmental Assessment (DEA), Pre-Assessment Consultation Request for the Proposed Hawaiian Islands Fiber Link Project, Statewide, Multiple TMKs.

Thank you for the opportunity to review the Draft Environmental Assessment (DEA) pre-assessment consultation request for the proposed Hawaiian Islands Fiber Link (HIFL) project, located at the above-referenced TMKs on the islands of Maui, Lāna'i, and Moloka'i. The State Historic Preservation Division (SHPD) has reviewed the Draft Environmental Assessment (DEA) pre-assessment consultation request and provides the following comments:

The proposed HIFL project is a low latency and robust design submarine cable system that will improve Hawai'i interisland connectivity and digital services. HIFL will be a carrier-neutral, open-access system with landing sites on O'ahu, Hawai'i, Maui, Kaua'i, Lāna'i, and Moloka'i. The system will have 24 fiber pairs with a design life of 25 years and is expected to be ready for service in late 2026.

Ocean Networks is responsible for the supply, construction, operations, and maintenance of the HIFL interisland cable system. The project is being overseen by the University of Hawai'i System Office for Information Technology with support from the Research Corporation of the University of Hawai'i.

Each landing facility will include a seaward-facing underground pipe, beach manhole, terrestrial conduit, and a cable station building. The subsea cable, beach manhole, and conduit will remain underground. Some areas will have fiber optic cables that are aboveground and attached to existing telecom/electric poles.

SHPD recommends that the Draft Environmental Assessment comply with all applicable laws and rules for Hawai‘i Revised Statues Chapter 343 - Hawai‘i Environmental Policy Act and Hawai‘i Administrative Rules (HAR) Chapter 11-200.1 - Environmental Impact Statement Rules. Including the 1997 Guidelines for Assessing Cultural Impacts adopted by the Environmental Council. Including a Ka Pa‘akai o ka ‘Āina Framework analysis of the proposed project required by Hawai‘i Supreme Court case law and Article XII §7 of the Hawai‘i State Constitution.

SHPD recommends that the Draft Environmental Assessment utilize SHPD-permitted archaeological firms with professional qualifications that meet the Department of Interior's Standards and Guidelines and Hawai‘i Administrative Rules (HAR) 13-281 for any archaeological work.

SHPD recommends early, sustained, and respectful collaboration and consultation with Native Hawaiian Organizations, Native Hawaiian cultural practitioners, lineal descendants, and community stakeholders for the development of the Draft Environmental Assessment in alignment with the 2023 Department of Interior's Departmental Responsibilities for Consideration and Inclusion of Indigenous Knowledge in Departmental Actions and Scientific Research, 301 DM 7.

SHPD requests to review and comment on any construction or land-altering activities in alignment with HRS §6E and HAR §13-275.

REGARDING KAUA‘I AND O‘AHU

This project may impact TMKs (4) 3-7-033:007, (4) 3-7-003:017, (4) 3-7-003:999, (4) 3-7-007:003 on the island of Kaua‘i; and (1) 9-1-026:027, (1) 9-1-016:220, (1) 1-1-015:013 on the island of O‘ahu.

The **SIHP** list below documents culturally significant historic properties. Documents dealing with Iwi kūpuna (ancestral remains) are deemed sensitive according to HAR §13-300-4(1). It is culturally inappropriate to share the location of iwi kūpuna. On Kaua'i island in the moku (district) of Puna and the ahupua'a of Hanamā‘ulu, the historic properties are as follows:

State Inventory of Historic Places
50-30-08-00884
50-30-08-00885
50-30-08-01827 Kalepa Platform Burial
50-30-08-01838
50-30-08-01839
50-30-08-01840
50-30-08-01842
50-30-08-01843
50-30-08-00997 Wailua Golf Course Burials
50-30-80-01844 Historic Cemetery
50-30-08-01848
50-30-08-01848
50-30-08-01980 Wailua Golf Course Burials

50-30-08-02066
50-30-08-02067
50-30-08-02068
50-30-08-01838
50-30-08-01839
50-30-08-01840
50-30-08-01841
50-30-08-01842
50-30-08-01843
50-30-08-01845
50-30-08-01846
50-30-08-01847
50-30-08-02066
50-30-08-02067 Historic Cemetery
50-30-08-02068
50-30-08-02208
50-30-08-02496 Burial
50-30-08-09353
50-30-08-09354
50-30-08-09355
50-30-08-09356
50-30-08-00102
50-30-08-00210
50-30-08-00211
50-30-11-00818

Princess Victoria Kamāmalu is the daughter Mataio Kekūanaōʻa and Kinaʻu. Both of her parents are of the Kamehameha line. Kekūanaōʻa is the son of Pauli Kaʻōleiokū (Son of Kamehameha I and Kānekapolei) and her mother, Keōuawahine, is the daughter of one of the Kona uncles that helped with the rise in power of Kamehameha I on Hawaiʻi island. Kameʻeiamoku is a māhoe (twin) his brother is Kamanawa and they are the two aliʻi pictured on the Seal of the State of Hawai'i. The father of nā mahoe (the twins) was high chief Keawepoepoe (Kauaʻi) and the mother was Kanoena her father's sister.

In 1860, Kamāmalu claimed the ahupuaʻa of Hanamāʻulu, except for the kuleana parcels. In the Buke Māhele Volume 9, pages 263-266 Apana 2.7. The Land Commission Award or LCA number is 7713:2.7. The Royal Patent Grant number is 4481. The documentation illustrates that these lands are part of what makes up the Crown and Government Lands of the Hawaiian Kingdom. The Crown and Government lands of the Hawaiian Kingdom have never been officially inventoried since the Great Māhele of 1848.

Land and genealogy go hand and hand and it is important to understand from the native perspective about the symbiotic relationship between the kupa ʻāina (people that live on the land) and the land as the elder sibling in the human family. The kupa ʻāina fully understand the impact a project will have on a parcel of land, along with the history and origin stories which allows the land to tell itʻs own moʻolelo or history.

Below is a list of NHO‘s in the project area as follows:

Kaua‘i Historical Society
Kaua‘i Historical Society
P.O. Box 1778, Līhu‘e, Hi. 96766
info@kauaihistoricalsociety.org
(808) 245-3373

Randy Wichman
Linda Moriarty
Reg Gage
Wanda Kau-Shibata
Joe Meboe
Haunani Rossi
Pua Rossi-Fukino
Delia Akaji
Jim Powell
Ramona Kincaid
Jim Saylor
Shannon Hiramoto
John Martin

Grove Farm
1850 Kaumualii Hwy, Lihue, HI 96766, USA
Phone: (808) 245-3678

Hanalei Watershed Hui
Hanaleiwatershedhui@gmail.com
(808) 346-5458

Waipā Foundation
Waipafoundation.org

The Historian Kepa Maly has created a comprehensive volume of historical and cultural significance in his paper entitled, *He Mo‘olelo ‘Āina Traditions and Storied Places in the District of ‘Ewa, Moanalua*, 2012 for the HART Rail Project. The cultural and historical information is comprehensive including place names and the mo‘olelo (history) of Pu‘uloa with a map of the loko i‘a (fishpond). Pu‘uloa was the breadbasket of the Central Plains of O‘ahu.

The historic properties contained in the system yield a large amount of karst and cairns relative to this specific area have been identified and documented by SIHP numbers. In cultural consultation with the Kānehili Cultural Hui and the late iwi kūpuna advocate Mike Lee met with HART rail and SHPD to discuss his concerns about the karst systems found underground. He also referred to the ‘ōpae ‘ula and endemic freshwater shrimp only found in Hawai‘i and the environment they inhabit are the karst systems found in ‘Ewa.

Mikahela Kekauʻōnohi was the chiefess that obtained by title the crown and government lands of Honouʻuliʻuli in ʻEwa during the Māhele of 1848. The Land Commission Award number 11216 established that the Kamehameha ʻohana lived in the lands of ʻEwa. Kekauʻōnohi was given large swaths of land on nearly every island including the lands of ʻEwa moku.

Genealogy connects humans to ʻāina (that which feeds) or land. It is very important to understand fully the moʻolelo or history of those that live on the land. There are several Native Hawaiian Groups that help to care for these places that count in ʻEwa. Native Hawaiian groups are the source of cultural genealogy information from the kupa ʻāina or people that live on the land. The kupa ʻāina know how the land connects humans and the significant historical and cultural properties that exist within these places that count to the community.

See the list below for more information.

Hui o Hoʻohonua
PO Box 2546
ʻEwa Beach, Hawaiʻi, 96706

Kānehili Cultural Hui
John Bond https://leewardreporter.com/author/ewabond/

ʻOhana Kūpono Consulting Service
Mana Caceres
Mākoa Caceres
808-222-2777

Hālau o Puʻuloa
Nālani Blane Kealaiki, ʻEwa Region
nakealai@ksbe.edu

REGARDING MOLOKAʻI

This project may impact TMKs (2) 5-3-001:011; (2) 5-3-001:003; (2) 5-3-999:999; (2) 5-3-003:999; (2) 5-3-003:014; and (2) 5-3-003:013 on the island of Molokaʻi.

- There may be cultural and archaeological sites within the project area.

REGARDING LĀNAʻI

This project may impact TMKs (2) 4-9-017:002; (2) 4-9-017:006; and (2) 4-9-017:027 on the island of Lānaʻi.

- SHPD records indicate that there are several historic properties on TMK Nos: (2) 4-9-017:002 and (2) 4-9-017:006. The SIHP numbers for the historic properties are as follows:
    - SIHP #50-40-98-01512 (Historic Wall)

- SIHP #50-40-98-01514 (Walls and Enclosure)
- SIHP #50-40-98-01515 (Enclosure)
- SIHP #50-40-98-01516 (Hulopoʻe Beach Cultural Deposit)
- SIHP #50-40-98-01517 (Coastal Site Complex)
- SIHP #50-40-98-01518 (Coastal Site Complex)
- SIHP #50-40-98-01519 (Habitation Complex)
- SIHP #50-40-98-01520 (Coastal Site Complex)
- SIHP #50-40-98-01521 (Pavement, Midden, and Lithic Scatter)
- SIHP #50-40-98-01522 (Cattle Chute and Holding Pen Site)
- SIHP #50-40-98-01523 (Coastal Site Complex)
- SIHP #50-40-98-00085 (Hulopoʻe Complex)
- SIHP #50-40-98-00018 (Koʻa)

- **Burial Sites have also been identified on TMK (2) 4-9-017:003**, which is located next to the project area.
- There are numerous other historic sites identified in Kamaʻo Ahupuaʻa and Pālāwai Ahupuaʻa surrounding the TMKs in the immediate project area.

REGARDING MAUI

This project may impact TMKs (2) 3-7-001:021; (2) 3-7-001:022; (2) 3-7-001:999; (2) 3-8-007:001; (2) 3-8-007:127; (2) 3-8-007:999; (2) 3-8-007:125; and (2) 3-8-007:040 on the island of Maui.

- There may be cultural and archaeological sites within the project area.

REGARDING HAWAIʻI ISLAND

This project may impact TMKs (3) 2-1-009:001; (3) 2-1-011:004; (3) 2-1-011:005; (3) 2-1-011:010; (3) 2-4-056:017; and (3) 2-4-001:167 on the island of Hawaiʻi. These comments are part of the pre-assessment consultation as a part of the enviromental review process for HIFL, pursuant to the requirements of HRS Chapter 343 and HAR 11-200.1. The Hawaiʻi State Historic Preservation Division (SHPD) has the following comments:

- SHPD records indicate that there are several historic properties on TMK No: (3) 2-4-001:167. The SIHP numbers for the historic properties are as follows:
    - SIHP #50-10-35-18911 (Complex)
    - SIHP #50-10-35-18912 (Complex)
    - SIHP #50-10-35-18913 (Rectangular Mound)
    - SIHP #50-10-35-18914 (Complex)
- SHPD does not have SIHP records for TMK Nos. (3) 2-1-009:001; (3) 2-1-011:004; (3) 2-1-011:005; and (3) 2-1-011:010. However, sites have been identified on what is currently TMK (3) 2-1-011:005 through a Bishop Museum survey by Alfred Hudson (1932). They are as follows:
    - Site 39 (Burial Vault). Located “on the end of a point on the east side of Puhi Bay.”
    - Site 40 (Complex). Located 1/8 mile east of Site 39.

    - Site 41 (Platform). "...stone platform, probably koa [koʻa], on point of lava at east end of Puhi Bay."
    - Site 42 (Platform). "Remains of small stone platform, 100 feet inland from site 41."
- Additionally, SHPD is aware of an unidentified platform near the boundary of TMK Nos. (3) 2-1-011:004 and (3) 2-1-011:005. SHPD recommends field testing of this feature.
- SHPD also recommends an ethnographic study of TMK Nos. (3) 2-1-009:001; (3) 2-1-011:004; (3) 2-1-011:005; and (3) 2-1-011:010 as the Keaukaha community very likely has further information about the history of this portion of the project area.

The SHPD may have additional comments regarding this project should it be submitted to our office for review.

Please submit all forthcoming information and correspondence related to this project via HICRIS under Project No. 2025PR00544 using the "Project Supplement" option.

The University of Hawaiʻi is the office of record for this undertaking. Please retain a copy of this letter in your environmental review record.

If you have any questions about the contents of this letter, please contact Christopher "Ikaika" Nakahashi at chris.nakahashi@hawaii.gov for the island of Maui and Molokaʻi. For any further questions concerning the Kauaʻi and Oʻahu contents of this letter, please contact Kaʻāhiki Solis at sheleigh.solis@hawaii.gov. If you have any questions about the Lānaʻi contents of this letter, please contact Noah Gomes at noah.gomes@hawaii.gov. For any questions about the Hawaiʻi Island contents of this letter, please contact Chris Omerod at christian.omerod@hawaii.gov.

Again, thank you for the opportunity to provide early consultation on this project.

Mahalo,



Jessica L. Puff
State Historic Preservation Administrator
Deputy State Historic Preservation Officer

Hawaiian Islands Fiber Link

July 14, 2025

Ms. Jessica Puff
State Historic Preservation Division
601 Kamokila Boulevard, Suite 555
Kapolei, Hawai'i 96707

Subject: Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment

Dear Ms. Puff,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your questions are provided below; this information will also be included in the Draft Environmental Assessment (EA), as appropriate.

- SHPD recommends that the Draft Environmental Assessment comply with all applicable laws and rules for Hawai'i Revised Statues Chapter 343 - Hawai'i Environmental Policy Act and Hawai'i Administrative Rules (HAR) Chapter 11-200.1 - Environmental Impact Statement Rules. Including the 1997 Guidelines for Assessing Cultural Impacts adopted by the Environmental Council. Including a Ka Pa'akai o ka 'Āina Framework analysis of the proposed project required by Hawai'i Supreme Court case law and Article XII §7 of the Hawai'i State Constitution.

  We acknowledge the need to comply with the requirements of Hawai'i Revised Statutes (HRS) Chapter 343 and HAR Chapter 11-200.1, including the 1997 Guidelines for Assessing Cultural Impacts and the Ka Pa'akai o ka 'Āina framework analysis, and will ensure that the appropriate information is contained in the Draft EA document.

- SHPD recommends that the Draft Environmental Assessment utilize SHPD-permitted archaeological firms with professional qualifications that meet the Department of Interior's Standards and Guidelines and Hawai'i Administrative Rules (HAR) 13-281 for any archaeological work.

  ONI has contracted Pacific Legacy, Inc. to assist with the archaeological work for the project. Pacific Legacy is staffed with qualified archaeologists and meets the requirements specified by the Department of the Interior and HAR Section 13-281 for archaeological work, including a current permit from the State Historic Preservation Division (SHPD) to carry out archaeological investigations in the State of Hawai'i (SHPD Permit No. 25-11).

- SHPD recommends early, sustained, and respectful collaboration and consultation with Native Hawaiian Organizations, Native Hawaiian cultural practitioners, lineal descendants, and community stakeholders for the development of the Draft Environmental Assessment in alignment with the 2023 Department of Interior's Departmental Responsibilities for Consideration and Inclusion of Indigenous Knowledge in Departmental Actions and Scientific Research, 301 DM 7.

  Consultation with Native Hawaiian Organizations, Native Hawaiian cultural practitioners, lineal descendants, and community stakeholders was initiated early in the project development

process and is planned to continue through the permitting and construction phases of the project. Specific efforts include individual outreach, community town hall meetings, and engagement through the Cultural Impact Assessment (CIA) and Ka Pa'akai Analysis, consultation related to historic preservation review under HRS Chapter 6E, and consultation in compliance with Section 106 of the National Historic Preservation Act (NHPA). Both past and future engagement efforts will be summarized in the Draft EA.

- SHPD requests to review and comment on any construction or land-altering activities in alignment with HRS §6E and HAR §13-275.

  We acknowledge the need for SHPD to review and comment on any construction or land-altering activities. A submittal packet initiating consultation with SHPD pursuant to HRS Chapter 6E was submitted to SHPD via HICRIS on June 23, 2025.

- [Site specific information provided for each island]

  We appreciate the detailed information provided regarding historic properties, cultural resources, and Native Hawaiian Organizations relevant to each of the proposed cable landing sites. We will ensure that this information is incorporated into the historic preservation review and cultural impact assessment process for the Project. This information will also be summarized in the Draft EA.

- The SHPD may have additional comments regarding this project should it be submitted to our office for review.

  We acknowledge that SHPD may have additional comments and will seek to address those comments through the relevant consultation process.

- Please submit all forthcoming information and correspondence related to this project via HICRIS under Project No. 2025PR00544 using the "Project Supplement" option.

  We appreciate the assignment of a HICRIS Project Number and will include this information in all future correspondence and submittals.

- The University of Hawai'i is the office of record for this undertaking. Please retain a copy of this letter in your environmental review record.

  We acknowledge the need to retain a copy of SHPD's letter in the environmental review records for the project.

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

DEPARTMENT OF PLANNING AND PERMITTING
KA 'OIHANA HO'OLĀLĀ A ME NĀ PALAPALA 'AE
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAI'I 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041 • WEBSITE: honolulu.gov/dpp

RICK BLANGIARDI
MAYOR
MEIA

DAWN TAKEUCHI APUNA
DIRECTOR
PO'O

BRYAN GALLEGHER, P.E.
DEPUTY DIRECTOR
HOPE PO'O

REGINA MALEPEAI
2ND DEPUTY DIRECTOR
HOPE PO'O KUALUA

May 2, 2025

2025/ELOG-677(ST)

Ms. Lisa Kettley
Tetra Tech Inc.
737 Bishop Street, Suite 2000
Honolulu, Hawaii 96813

info@hifl.llc

Dear Ms. Kettley:

SUBJECT: Pre-Assessment Consultation
Hawaii Revised Statutes Chapter 343
Hawaiian Islands Fiber Link Project (Project)
Barbers Point Beach Park, Olai Street, Kalaeloa and Kamokila Boulevard and Farrington Highway Rights-of-way, University of Hawaii (West Oahu)
Tax Map Keys 9-1-026: 027, 9-1-016: 220, and 1-1-015: 013

This responds to your request, received on April 9, 2025, for comments on the forthcoming Draft Environmental Assessment (DEA) for the above-referenced Project. We offer the following comments:

1. Permit Requirements: The list of Required Permits and Approvals must include a Special Management Area (SMA) Major Permit and a Shoreline Setback Variance (SSV). The SMA Major Permit is approved by Resolution of the City Council. The Department of Planning and Permitting (DPP) is the approving authority for the SSV and any Zoning Permits.

2. Revised Ordinances of Honolulu (ROH) Chapter 25, the SMA Ordinance: It should be noted that the DEA is also being prepared pursuant to ROH Chapter 25. The DEA should include an analysis of the Project's consistency with each of the SMA policies presented in ROH Section 25-3.1, as well as the mandatory findings contained in ROH Section 25-4.1.

Some specific issue areas requiring analyses are as follows:

Coastal Hazards – As an important infrastructure facility located on a coastal property, the DEA should address possible coastal hazards which could expose the facility in the future, including sea level rise, wave action, flooding erosion, tsunamis, and storm surge. The DEA should include a discussion of how long-term mitigative and or adaptive measures, if any, must be considered and evaluated. This analysis should evaluate the site's existing topographic, geologic, and shoreline environment, and how the proposed Project avoids impacts associated with such coastal hazards. Describe how the Project will be designed for resiliency to six feet of sea level rise. The DEA should evaluate potential impacts, and incorporate appropriate mitigation measures to avoid or minimize potential impacts where appropriate.

Near-shore and Sensitive Species – The DEA should identify the potential for presence of threatened, endangered, or protected flora and fauna, and their critical habitat within the Project area. We recommend consulting the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation database to obtain a list of species that are known to occur, or may potentially occur, in the Project vicinity. Known, mapped wetlands and streams can be viewed on the USFWS National Wetlands Inventory Wetlands Mapper. The State Department of Land and Natural Resources, Department of Aquatic Resources, and Department of Forestry and Wildlife, should be consulted regarding the potential presence of State-listed sensitive species or critical habitat. Include a discussion on the potential for the spread of invasive species, such as little fire ants, coconut rhinoceros beetles, or the fungus that causes rapid ohia death. The DEA must evaluate potential impacts of each of these issues, and incorporate standard agency-required mitigation measures as well as any Project-specific mitigation measures required to avoid or minimize potential impacts.

Archaeological, Cultural, and Historic Resources – The DEA must identify the soil types present throughout the Project area, and provide background information regarding the known historic resources and unknown historic resources, including the disinterment and reinternment of iwi kupuna (Native Hawaiian burials), which were encountered during the original development of the shoreline park and nearby industrial park. Include a discussion on the cultural sites and practices in this area which may have previously been addressed and remain relevant to the proposed Project. The DEA must also discuss the potential for encountering unknown historic properties during ground-disturbing activities required for Project implementation. The DEA must evaluate potential impacts of each of these issues, and incorporate standard agency-required

mitigation measures as well as any Project-specific mitigation measures required to avoid or minimize potential impacts.

We also recommend the DEA include an analysis of the continued potential impact of the Project to Native Hawaiian access and cultural practices (Ka Paakai analysis). The DEA must address potential impacts and incorporate standard agency-required mitigation measures to avoid or minimize such potential impacts.

Should you have any questions, please contact Steve Tagawa, of our Land Use Approval Branch, at (808) 768-8024 or via email at stagawa@honolulu.gov

Very truly yours,

for Dawn Takeuchi Apuna
Director

cc: Department of Parks and Recreation
Office of Planning and Sustainable Development,
Environmental Review Program

Hawaiian Islands Fiber Link

July 14, 2025

Ms. Dawn Apuna
City and County of Honolulu Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

Subject: Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai'i Revised Statutes (HRS) Chapter 343 Environmental Assessment

Dear Ms. Apuna,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your comments are provided below; this information will also be included in the Draft Environmental Assessment (EA) as appropriate.

- Permit Requirements: The list of Required Permits and Approvals must include a Special Management Area (SMA) Major Permit and a Shoreline Setback Variance (SSV). The SMA Major Permit is approved by Resolution of the City Council. The Department of Planning and Permitting (DPP) is the approving authority for the SSV and any Zoning Permits.

  We acknowledge the need for an SMA Major Permit and Shoreline Setback Variance and will engage with DPP staff in pursuit of these requirements.

- Revised Ordinances of Honolulu (ROH) Chapter 25, the SMA Ordinance: It should be noted that the DEA is also being prepared pursuant to ROH Chapter 25. The DEA should include an analysis of the Project's consistency with each of the SMA policies presented in ROH Section 25-3.1, as well as the mandatory findings contained in ROH Section 25-4.1.

  The Draft EA will address compliance with ROH Chapter 25 and will include a discussion of the project's consistency with the SMA policies presented in ROH Section 25-3.1, as well as the mandatory findings contained in ROH Section 25-4.1.

- Coastal Hazards - As an important infrastructure facility located on a coastal property, the DEA should address possible coastal hazards which could expose the facility in the future, including sea level rise, wave action, flooding erosion, tsunamis, and storm surge. The DEA should include a discussion of how long¬ term mitigative and or adaptive measures, if any, must be considered and evaluated. This analysis should evaluate the site's existing topographic, geologic, and shoreline environment, and how the proposed Project avoids impacts associated with such

coastal hazards. Describe how the Project will be designed for resiliency to [six feet of sea level rise]. The DEA should evaluate potential impacts, and incorporate appropriate mitigation measures to avoid or minimize potential impacts where appropriate.

The Draft EA will include a description of the existing topographic, geologic, and shoreline environment and a detailed discussion of the potential impacts and appropriate mitigation measures associated with coastal hazards and resiliency of the project relative to these hazards, particularly sea level rise.

- Near-shore and Sensitive Species -The DEA should identify the potential for presence of threatened, endangered, or protected flora and fauna, and their critical habitat within the Project area. We recommend consulting the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation database to obtain a list of species that are known to occur, or may potentially occur, in the Project vicinity. Known, mapped wetlands and streams can be viewed on the USFWS National Wetlands Inventory Wetlands Mapper. The State Department of Land and Natural Resources, Department of Aquatic Resources, and Department of Forestry and Wildlife, should be consulted regarding the potential presence of State-listed sensitive species or critical habitat. Include a discussion on the potential for the spread of invasive species, such as little fire ants, coconut rhinoceros beetles, or the fungus that causes rapid ohia death. The DEA must evaluate potential impacts of each of these issues, and incorporate standard agency-required mitigation measures as well as any Project-specific mitigation measures required to avoid or minimize potential impacts.

  The Draft EA will include a detailed discussion of the potential impacts and appropriate mitigation measures relative to federally and state listed species, critical habitat, and invasive species. Information from the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (iPaC) database and the National Wetlands Inventory (NWI) wetland mapper have been integrated into the due diligence studies conducted to date, and the resource agencies will be consulted as appropriate; a summary of this information will be included in the Draft EA.

- Archaeological. Cultural, and Historic Resources -The DEA must identify the soil types present throughout the Project area, and provide background information regarding the known historic resources and unknown historic resources, including the disinterment and reinternment of iwi kupuna (Native Hawaiian burials), which were encountered during the original development of the shoreline park and nearby industrial park. Include a discussion on the cultural sites and practices in this area which may have previously been addressed and remain relevant to the proposed Project. The DEA must also discuss the potential for encountering unknown historic properties during ground-disturbing activities required for Project implementation. The DEA must evaluate potential impacts of each of these issues, and incorporate standard agency-required mitigation measures as well as any Project-specific mitigation measures required to avoid or minimize potential impacts.

  The Draft EA will identify the soil types present within the project study area, provide information regarding previously identified historic resources, and discuss relevant cultural sites and practices that may be impacted by the project. The Draft EA will also address

potential impacts associated with encountering unknown historic properties during project implementation and project-specific mitigation measures to avoid and minimize any such impacts.

- We also recommend the DEA include an analysis of the continued potential impact of the Project to Native Hawaiian access and cultural practices (Ka Paakai analysis). The DEA must address potential impacts and incorporate standard agency-required mitigation measures to avoid or minimize such potential impacts.

  We acknowledge the requirements for a Ka Pa'akai o ka ʻĀina analysis and will ensure that the Draft EA includes an analysis of the project's potential impact to Native Hawaiian access and cultural practices, as well as mitigation measures to avoid and minimize any such impacts.

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

JOSH GREEN, M.D.
GOVERNOR | KE KIA'ĀINA

SYLVIA LUKE
LIEUTENANT GOVERNOR | KA HOPE KIA'ĀINA

STATE OF HAWAIʻI | KA MOKUʻĀINA ʻO HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
KA ʻOIHANA KUMUWAIWAI ʻĀINA

DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

DAWN N.S. CHANG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RYAN K.P. KANAKAʻOLE
FIRST DEPUTY

CIARA W.K. KAHAHANE
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

Lisa Kettley, Senior Planner
Tetra Tech Inc.
737 Bishop Street, Suite 2000
Honolulu, HI 96813

Dear Lisa Kettley,

RE: Hawaiian Islands Fiber Link Project

The Department of Land and Natural Resources—Division of Forestry and Wildlife (DOFAW) has received Ocean Networks' communication regarding review and comment on a draft environmental assessment (EA) for an interisland submarine fiber optic cable system making landfall at various locations across the state and impacting numerous TMKs (referenced on page seven of the packet received by DOFAW). The project consists of **1)** horizontal directional drilling (HDD) to traverse the shoreline to an offshore punchout location; **2)** installation of beach manholes, **3)** installation of terrestrial fiber optic cable and conduit; and **4)** construction of a cable landing station with associated cable termination and monitoring equipment.

DOFAW has concluded that the project site at Nukoliʻi Beach, Kauaʻi overlaps with Federally designated critical habitat for the honu or green sea turtle (*Chelonia mydas*). The Barber's Point, Oʻahu worksite overlaps with Federally designated critical habitat for numerous endangered plant species to include: ʻakoko (*Euphorbia celastroides* var. *kaenana*), awiwi (*Schenkia sebaeoides*), koʻokoʻolau (*Bidens amplectans*), maʻoliʻoli (*Schiedea kealiae*), ohai (*Sesbania tomentosa*), round-leaved chaff-flower or Maui chaff-flower (*Achyranthes splendens* var. *rotundata*), and Oahu cow-pea (*Vigna owahuensis*). There are no Federally designated critical habitats near the Hawaiʻi Island, Lānaʻi, Maui, or Molokaʻi project areas.

Many of these work areas are also near Federal or State administered lands. The landfall zone on Kauaʻi is under a mile from the State Kalepa Mountain Forest Reserve and the terminus site at the Kauaʻi Community College is within ca. 1.35 miles of the Huleia National Wildlife Refuge. The landfall area on Oʻahu is about a mile away from the Pearl Harbor National Wildlife Refuge—Kalaeloa Unit. The landfall zone on the

island of Lānaʻi is ca. 0.55 miles from the State Puʻu Pehe Islet Seabird Sanctuary. The landfall site on Maui is ca. 1.22 miles from the State Kanahā Pond Wildlife Sanctuary. Since these areas contain unique botanical assets that provide habitat for a variety of rare native wildlife species, DOFAW requests that special attention is paid to the recommendations made at the end of this letter regarding forest pathogens, and invasive species.

The Division notes that there is potential for several State listed species, protected under HRS § 195D, to found within the proposed project area. These include: **1)** ʻōpeʻapeʻa, or Hawaiian hoary bat (*Lasiurus semotus*); **2)** several species of seabirds and waterbirds; **3)** ʻīlio holo ī ka uaua or Hawaiian monk seal (*Monachus schauinslandi*); **4)** honu or green sea turtle (*Chelonia mydas*); **5)** honuʻea or hawksbill sea turtle; Blackburn's sphinx moth (*Manduca blackburni*); and **6)** numerous listed plant species.

The State listed ʻōpeʻapeʻa or Hawaiian hoary bat (*Lasiurus semotus*) could potentially occur at or in the vicinity of the project and may roost in nearby trees. Any required site clearing should be timed to avoid disturbance to bats during their birthing and pup rearing season (June 1 through September 15). During this period woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed. Barbed wire should also be avoided in any construction as bats can become ensnared and killed by such fencing material during flight.

Artificial lighting can adversely impact seabirds that may pass through the area at night by causing them to become disoriented. This disorientation can result in their collision with manmade structures or the grounding of birds. For nighttime work that might be required, DOFAW recommends that all lights used be fully shielded to minimize the attraction of seabirds. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season, from September 15 through December 15, when young seabirds make their maiden voyage to sea.

If nighttime construction is required during the seabird fledgling season (September 15 to December 15), we recommend that a qualified biologist be present at the project site to monitor and assess the risk of seabirds being attracted or grounded due to the lighting. If seabirds are seen circling around the area, lights should then be turned off. If a downed seabird is detected, please follow DOFAW's recommended response protocol by visiting https://dlnr.hawaii.gov/wildlife/seabird-fallout-season/

Permanent lighting found at facilities also poses a risk of seabird attraction, and as such should be eliminated or minimized to the greatest extent possible to protect seabird flyways and preserve the night sky. If lighting is needed please review https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf for illustrations and guidance related to seabird-friendly light styles that also protect seabirds and the dark starry skies of Hawaiʻi.

State-listed waterbirds such as aeʻo or Hawaiian stilt (*Himantopus mexicanus knudseni*), ʻalae keʻokeʻo or Hawaiian coot (*Fulica alai*), ʻalae ʻula or Hawaiian gallinule

(*Gallinula chloropus sandvicensis*), koloa maoli or Hawaiian Duck (*Anas wyvilliana*), and nēnē or Hawaiian goose (*Branta sandvicensis*) could potentially occur at or in the vicinity of the proposed project site. It is against State law to harm or harass these species. If any of these species are present during construction, all activities within 100 feet (30 meters) should cease and the bird or birds should not be approached. Work may continue after the bird or birds leave the area of their own accord. If a nest is discovered at any point, please refer to the image at the end of this letter and contact the appropriate DOFAW Branch office and establish a buffer zone around the nest.

The State endangered ʻīlio holo i ka uaua or Hawaiian monk seal (*Monachus schauinslandi*) and threatened honu or green sea turtle (*Chelonia mydas*) could potentially occur or haul out onshore within the vicinity of the proposed project site. Nesting season for honu is April through December and ʻīlio holo i ka uaua can give birth to pups all year round. If either species is detected within 100 feet (30 meters) of the project area, all nearby construction operations should cease and not continue until the focal animal has departed the area on its own accord.

The State endangered honuʻea or hawksbill sea turtle (*Eretmochelys imbricata*) can nest on the island during the months of May through December and could potentially occur or haul out onshore within the vicinity of the proposed project site. If the species is detected within 100 feet of the project area, all nearby construction operations should cease and not continue until the focal animal has departed the area on its own accord.

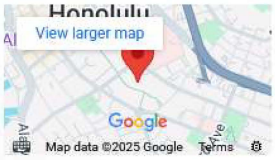
The project area is within the range of the State listed Blackburn's sphinx moth (*Manduca blackburni*) or BSM. Larvae of BSM feed on many nonnative hostplants, which includes tree tobacco (*Nicotiana glauca*), that grow in disturbed areas. We recommend contacting the **Hawaiʻi Island Branch DOFAW office at (808) 974-4221 or the Maui Branch DOFAW office at (808) 984-8100** for further information about where BSM may be present and whether a vegetation survey should be conducted to determine the presence of BSM host plants. DOFAW recommends removing plants less than one meter in height or during the dry season to avoid harming BSM. If there is intent to either remove tree tobacco over one meter in height, or to disturb the ground around or within several meters of these plants, they must be thoroughly inspected by a qualified entomologist for the presence of BSM eggs and larvae.

To prevent the spread of Rapid ʻŌhiʻa Death (ROD), DOFAW requests that removal, pruning/trimming, and potentially injury to ʻōhiʻa trees be avoided as much as possible. Wounds serve as entry points for ROD fungus and increase the odds that the tree will be infected and die. Also, clean gear/tools, clothes, footwear, and vehicles before and after use. Make sure to removal all loose soil from the aforementioned items, spray gear/tools with 70% rubbing alcohol, and wash clothes with hot water and soap. Wash tires and undercarriages of all vehicles/machinery with a high-pressure water source. If ʻōhiʻa trees must be removed or pruned/trimmed, please conduct these activities on a still day to minimize blown sawdust and use a sharp saw to create chips rather than dust. Seal all wounds to these trees with a stump seal product (e.g. Spectricide, etc.). For more information, please consult https://cms.ctahr.hawaii.edu/rod.

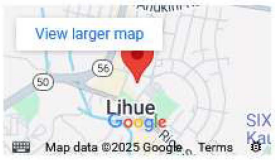
The invasive coconut rhinoceros beetle (*Oryctes rhinoceros*) or CRB is widespread on the island of Oʻahu. CRB have been detected on other islands with moderate infestation on Kauaʻi, one incipient site on Hawaiʻi Island, and only one positive site on Maui in 2023. Hawaiʻi Department of Agriculture interim rule 24-1 restricts the movement of CRB-host material from the island of Oʻahu, which is defined as the Quarantine Area. Regulated material (host material or host plants) is considered a risk for potential CRB infestation. Host material for the beetle specifically includes **1)** entire dead trees; **2)** mulch, compost, trimmings, fruit and vegetative scraps, and **3)** decaying stumps. CRB host plants include the live palm plants in the following genera: *Washingtonia*, *Livistona*, and *Pritchardia* (all commonly known as fan palms), *Cocos* (coconut palms), *Phoenix* (date palms), and *Roystonea* (royal palms). When such material or these specific plants are moved there is a risk of spreading CRB because they may contain CRB in any life stage. Inspection and/or treatment approved by HDOA is mandatory before inter-island transport. For more information regarding CRB, please visit https://dlnr.hawaii.gov/hisc/info/invasive-species-profiles/coconut-rhinoceros-beetle/.

We recommend consulting the appropriate island Invasive Species Committee **(Kauaʻi Invasive Species Committee (KISC) at (808) 821-1490; Oʻahu Invasive Species Committee (OISC) at (808) 266-7994; Molokaʻi/Maui Invasive Species Committee (MoMISC) at (808) 553-5236 ext. 6585; Maui Invasive Species Committee (MISC) at (808) 573-6472; Big Island Invasive Species Committee (BIISC) at (808) 933-3340 or biisc@hawaii.edu)** to help plan, design, and construct the project, learn of any high-risk invasive species in the area, and ways to mitigate their spread. Soil and plant material may contain detrimental fungal pathogens (like Rapid ʻŌhiʻa Death), vertebrate and invertebrate pests (e.g. Little Fire Ants, and Coconut Rhinoceros Beetle), or invasive plant propagules that will harm our native ecosystems, and the unique native found within them. Therefore, DOFAW advances the guidance that all equipment and personal items—to include clothing and foot ware should be cleaned of excess soil and debris to minimize the risk of spreading invasive species. Additionally, DOFAW recommends minimizing the movement of plant or soil material between worksites. Suspect pests should be reported through the statewide pest hotline. Photos, videos, and locations can be shared at www.643pest.org or call: 743-PEST. All equipment, materials, and personnel should be cleaned of excess soil and debris to minimize the risk of spreading invasive species.

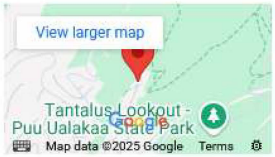
Statewide Administrative Branch
Kalanimoku Building
1151 Punchbowl St., Rm. 325
Honolulu, HI 96813
Phone: (808) 587-0166; Fax: (808) 587-0160
dlnr@hawaii.gov



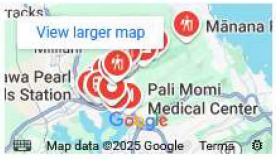
Kaua'i Branch
3060 Eiwa Street, Rm. 306
Līhu'e, HI, 96766
Phone: (808) 274-3433
Fax: (808) 274-3438



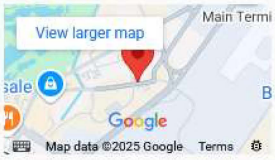
O'ahu Branch
2135 Makiki Heights Drive
Honolulu, HI, 96822
Phone: (808) 973-9778
Fax: (808) 973-9781
dlnrdo-faw.oahubranch@hawaii.gov



O'ahu Branch- Waimano Office
2551 Waimano Home Rd
Pearl City, HI, 96783



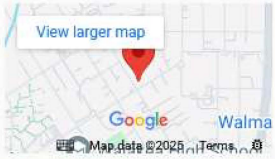
Maui Branch
685 Haleakala Hwy
Kahului, HI, 96732
Phone: (808) 984-8100
Fax: (808) 984-8114



Moloka'i
P.O. Box 347
Kaunakakai, HI, 96748
Phone: (808) 553-1745
Fax: (808) 553-1746

Lāna'i
P.O. Box 630661
917 Fraser Avenue
Lanai City, HI 96763
Phone: (808) 565-7916
Fax: (808) 565-7917

Hawai'i Island Branch
19 E. Kawili Street
Hilo, HI, 96720
Phone: (808) 974-4221
Fax: (808) 974-4226



Mahalo for contacting our office to receive guidance regarding the conservation of our native species. These comments are general guidelines and should not be considered comprehensive for this site or project. It is the responsibility of the applicant to do their own due diligence to avoid any negative environmental impacts. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If you have any questions, please contact Jesse W. Adams, Protected Species Habitat Conservation Planning Associate, at jesse.w.adams.researcher@hawaii.gov or call (808) 265-3276.

Sincerely,

JASON D. OMICK
Wildlife Program Manager

Hawaiian Islands Fiber Link

July 14, 2025

Mr. Jason Omick
State of Hawai‘i Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl Street, Room 325
Honolulu, Hawai‘i 96813

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai‘i Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Mr. Omick,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process.

We appreciate the information provided regarding relevant critical habitat for federally and state listed species, federal and state administered lands, invasive species and pathogens, and associated impact avoidance and minimization measures. This information has been incorporated into the biological resources survey reports generated for the project and will be further incorporated into the Draft Environmental Assessment (EA) as appropriate. We look forward to continued input and feedback from the Division of Forestry and Wildlife as the review process moves forward.

Thank you again for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

ENGINEERING DIVISION
DEPARTMENT OF PUBLIC WORKS
TROY K. TANIGAWA, P.E., COUNTY ENGINEER
BOYD GAYAGAS, DEPUTY COUNTY ENGINEER

DEREK S.K. KAWAKAMI, MAYOR
REIKO MATSUYAMA, MANAGING DIRECTOR

May 9, 2025

Tetra Tech Inc.
737 Bishop Street, Suite 2000
Honolulu, HI 96813
Attn: Lisa Kettley, HIFL Project

Subject: Pre-consultation for HRS Ch. 343 Draft Environmental Assessment
Hawaiian Islands Fiber Link Project
TMK: (4) 3-7003:007, 3-7-003:017, 3-7-003:999 (State Right of Way), 3-4-007:003

To Whom It May Concern:

We have reviewed the subject request that was submitted to our office April 9, 2024. We offer the following comments with respect to the proposed work on the island of Kaua'i:

1. The applicant shall comply with all provisions of the "Sediment and Erosion Control Ordinance No. 808", codified as Chapter 22, Article 7 of the Kaua'i County Code (KCC), to safeguard public health, safety, and welfare, to protect property, and to control soil erosion and sedimentation. KCC Section 22-7.6(j) exempts "trenching and backfilling for installation of utility and drainage conduits" from the permit requirements of the ordinance. However, all other provisions of the ordinance would still apply, and earthwork not related to utility conduits might require a permit. During construction, best management practices (BMPs) shall be incorporated to the maximum extent practicable to prevent damage by sedimentation, erosion, or dust to watercourses, natural areas, and other properties. The permittee and the property owner shall be responsible for ensuring that BMPs are satisfactorily implemented at all times.
2. As shown on Figure 2.1, A portion of the "fiber owned by licensed utility company as part of the existing utility system" appears to run along Akahi Street and Hardy Street, which are County streets. If there is any work on these streets that will require excavation or temporary traffic control, a Road Permit from the County of Kaua'i will be required.
3. There are no proposed structures; therefore, the County's Floodplain Ordinance does not apply.
4. We recommend contacting the County of Kaua'i, Planning Department to request a Departmental Determination with respect to the proposed development. Similarly, please contact the State of Hawaii, Department of Transportation for work within the State Right of Way.
5. Hawaiian Islands Fiber Link shall be responsible to secure all necessary approvals for the proposed work on private property.

Should you have any questions, please contact Bryan Wienand at (808) 241-4896 or bwienand@kauai.gov.

Sincerely,

Michael Moule, P.E.
Chief, Engineering Division

BW

Hawaiian Islands Fiber Link

July 14, 2025

Mr. Michael Moule
County of Kauai Department of Public Works
Engineering Division
4444 Rice Street, Suite 275
Lihuʻe, Hawaiʻi 96766

Subject: **Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawaiʻi Revised Statutes (HRS) Chapter 343 Environmental Assessment**

Dear Mr. Moule,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your comments are provided below; this information will also be included in the Draft Environmental Assessment (EA), as appropriate.

1. The applicant shall comply with all provisions of the "Sediment and Erosion Control Ordinance No. 808", codified as Chapter 22, Article 7 of the Kaua'i County Code (KCC), to safeguard public health, safety, and welfare, to protect property, and to control soil erosion and sedimentation. KCC Section 22-7.G(j) exempts "trenching and backfilling for installation of utility and drainage conduits" from the permit requirements of the ordinance. However, all other provisions of the ordinance would still apply, and earthwork not related to utility conduits might require a permit. During construction, best management practices (BMPs) shall be incorporated to the maximum extent practicable to prevent damage by sedimentation, erosion, or dust to watercourses, natural areas, and other properties. The permittee and the property owner shall be responsible for ensuring that BMPs are satisfactorily implemented at all times.

   We appreciate the information regarding "Sediment and Erosion Control Ordinance No. 808" and understand the need to comply with applicable provisions of the ordinance including implementation of BMPs during construction.

2. As shown on Figure 2.1, A portion of the "fiber owned by licensed utility company as part of the existing utility system" appears to run along Akahi Street and Hardy Street, which are County streets. If there is any work on these streets that will require excavation or temporary traffic control, a Road Permit from the County of Kaua'i will be required.

   The project's use of fiber owned by a licensed utility company as part of the existing utility system would not require any excavation or temporary traffic control work on county streets.

However, we acknowledge that should the project require any such work, a Road Permit from the County of Kaua'i would be required.

3. There are no proposed structures; therefore, the County's Floodplain Ordinance does not apply.

   We appreciate confirmation that the County's floodplain ordinance does not apply.

4. We recommend contacting the County of Kaua'i, Planning Department to request a Departmental Determination with respect to the proposed development. Similarly, please contact the State of Hawaii, Department of Transportation for work within the State Right of Way.

   The project team has conducted early consultation with the County of Kaua'i Planning Department regarding the proposed development, and will continue to coordinate with Planning Department staff to ensure the proper permits are obtained. Similarly, the project team has also begun coordination with the State Department of Transportation regarding work within the State Right of Way.

5. Hawaiian Islands Fiber Link shall be responsible to secure all necessary approvals for the proposed work on private property. Hawaiian Islands Fiber Link shall be responsible to secure all necessary approvals for the proposed work on private property."

   We acknowledge the need to obtain all necessary approvals for work on private property.

Thank you for your interest in the HIFL Project. We will keep you updated on the Project status and the availability of the Draft EA for public review.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.

JOSH GREEN, M.D.
GOVERNOR
KE KIA'ĀINA

EDWIN H. SNIFFEN
DIRECTOR
KA LUNA HO'OKELE

Deputy Directors
Nā Hope Luna Ho'okele
DREANALEE K. KALILI
TAMMY L. LEE
CURT T. OTAGURO
ROBIN K. SHISHIDO

STATE OF HAWAI'I | KA MOKU'ĀINA 'O HAWAI'I
DEPARTMENT OF TRANSPORTATION | KA 'OIHANA ALAKAU
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO

DIR0001747
STP 8.3924

May 19, 2025

VIA EMAIL: info@hifl.llc

Ms. Lisa Kettley
Tetra Tech Inc.
737 Bishop Street, Suite 2000
Honolulu, Hawaii 96813

Dear Ms. Kettley:

Subject: Pre-Assessment Consultation for Environmental Assessment (EA)
Hawaiian Islands Fiber Link Project

Thank you for your letter, dated April 7, 2025, requesting the Hawaii Department of Transportation's (HDOT) review and comments on the subject project. The HDOT understands that the State of Hawaii, represented by the University of Hawaii (UH) Vice President for Information Technology and Chief Information Officer, proposes to construct, operate, and maintain an interisland submarine fiber optic cable system intended to improve and expand high-speed internet access and availability across the state.

HDOT has the following comments:

The locations of four of the proposed cable landing stations at UH West Oahu / DR Fortress; UH Maui College; Molokai Yacht Club, Molokai; and UH Hilo, School of Education Center facilities are in the vicinity of four of our commercial harbors: Kalaeloa Barbers Point Harbor, Oahu; Kahului Harbor, Maui; Kaunakakai Harbor, Molokai; and Hilo Harbor, Hawaii Island.

1. Kahului Harbor – The HDOT requests further discussion regarding the angle/approach of the cable rising from the seabed to the West Kahului Harbor. It should be evaluated to ensure safe navigation and operations entering and departing Kahului Harbor.

    a. HDOT refers you to the following individuals: Doug Luther, UH Professor and Cooperative Institute for Marine and Atmospheric Research Director (email: dluther@hawaii.edu), Assaf Azouri, research specialist (email: assaf@hawaii.edu), and Uggo Ferraris, research specialist

(email: uggo@hawaii.edu), in which they are conducting the Development of Wave Surge Model Forecasting Project that studies wave energy in the vicinity of Kahului Harbor due to north swell. Such wave energy coupled with navigational hazard risks could have a potential impact to your "Subsea Cable (Segment 3)" that you are proposing to cross Kahului Harbor's Entrance Channel.

b. HDOT encourages inclusion of the Hawaii Pilots Association (email: hpa.officers@gmail.com and office@hawaiipilots.net) for their review and comments regarding their experience with piloting vessels into and out of Kahului Harbor. Also, HDOT encourages further outreach to harbor users for their emergency plans or risks of accidental dropping of anchors within the entrance channel that could occur which could ensnare your proposed subsea cable.

c. HDOT suggests that you pursue information to understand the potential impact of sea level rise to: a) groundwater inundation and b) shoreline erosion along Kahului Beach Road, to plans for resilient cable and connections to UH Maui College.

d. The site landing occurs on HDOT Property. Hawaiian Islands Fiber Link's designers will need to submit engineered plan drawing details to HDOT for the Horizontal Directionally Drilled Borehole alignment and conduit jackets that traverse through West-Kahului breakwater area when they proceed with engineering designs.

e. Tax Map Key (2) 3-7-001: 021 is under the control and management jurisdiction of HDOT; therefore, please coordinate with HDOT's Property Management section to secure all necessary land dispositions.

f. HDOT must be consulted on the final design to coordinate project construction with HDOT Harbors Maui District to avoid conflict with storage, cargo, or other harbor-related matters.

2. Kaunakakai Harbor – HDOT requests further discussion regarding the angle/approach of the cable rising from the seabed to the Molokai Yacht Club. HDOT requests information regarding the location of the cable to the causeway connecting the highway to Kaunakakai Harbor. Such discussion and information will provide HDOT with a better understanding of your plans and Geographic Information System coordinates of the cable, planning regarding the potential impact of sea level rise to Kaunakakai Harbor, and the flow of cargo into and out of this commercial harbor

3. A permit to Perform Work Upon State Highways is required for any work within the State highway right-of-way (Hawaii Revised Statutes, Chapter 264). The application includes the review and approval of construction drawings and a Traffic Management Plan.

Thank you for the opportunity to comment. Please keep us involved in the progress of your EA, the progression of your designs, and the coordination of future construction activities.

Please submit any subsequent land use entitlement-related requests for review or correspondence to the HDOT Land Use Intake email address at DOT.LandUse@hawaii.gov.

If there are any questions, please contact Mr. Blayne Nikaido, Planner, Land Use Section of the HDOT Statewide Transportation Planning Office at (808) 831-7979 or via email at blayne.h.nikaido@hawaii.gov.

Sincerely,

EDWIN H. SNIFFEN
Director of Transportation

Hawaiian Islands Fiber Link

July 14, 2025

Mr. Edwin Sniffen
State of Hawai‘i Department of Transportation
869 Punchbowl Street
Honolulu, Hawai‘i 96813

Subject: Hawaiian Islands Fiber Link (HIFL) Project; Pre-Assessment Consultation for Hawai‘i Revised Statutes (HRS) Chapter 343 Environmental Assessment

Dear Mr. Sniffen,

Thank you for your letter regarding the Hawaiian Islands Fiber Link (HIFL) Project. We appreciate you taking the time to review and provide input to the environmental review scoping process. Responses to your comments are provided below; this information will also be included in the Draft Environmental Assessment (EA) as appropriate.

1. Kahului Harbor – The HDOT requests further discussion regarding the angle/approach of the cable rising from the seabed to the West Kahului Harbor. It should be evaluated to ensure safe navigation and operations entering and departing Kahului Harbor.

   Marine vessel navigation and harbor operations were key considerations in the initial site selection and routing study for the Project, and the cable route design was developed based on detailed marine vessel navigational data (Marine Cadastre 2024 AIS Vessel Transit Counts). Based on these data, the cable segment that traverses the entrance channel to Kahului Harbor would be buried deeply below the recommended entrance route to the harbor via underground conduit installed using horizontal directional drilling (HDD). Specifically, the cable would be more than 40 feet deep for approximately 750 linear feet where it crosses the recommended entrance route, transitioning to a depth of approximately 10 feet below the seabed before punching out at the eastern end of the traffic boundary area. Articulated split pipe would be installed to provide additional protection beyond this boundary. In addition to these specific design considerations, Project implementation would include a Cable Awareness Program which would include close coordination with HDOT and other harbor users. Additional details regarding the cable routing and avoidance of impacts to navigation and operations at Kahului Harbor will be included in the Draft EA.

a. HDOT refers you to the following individuals: Doug Luther, UH Professor and Cooperative Institute for Marine and Atmospheric Research Director (email: dluther@hawaii.edu), Assaf Azouri, research specialist (email: assaf@hawaii.edu), and Uggo Ferraris, research specialist (email: uggo@hawaii.edu), in which they are conducting the Development of Wave Surge Model Forecasting Project that studies wave energy in the vicinity of Kahului Harbor due to north swell.

Such wave energy coupled with navigational hazard risks could have a potential impact to your "Subsea Cable (Segment 3)" that you are proposing to cross Kahului Harbor's Entrance Channel.

We appreciate the information regarding the Development of Wave Surge Model Forecasting Project and will consult with the recommended parties regarding impacts associated with wave energy as well as navigational hazard risks. This information will be reflected in the Draft EA as appropriate.

b. HDOT encourages inclusion of the Hawaii Pilots Association (email: hpa.officers@gmail.com and office@hawaiipilots.net) for their review and comments regarding their experience with piloting vessels into and out of Kahului Harbor. Also, HDOT encourages further outreach to harbor users for their emergency plans or risks of accidental dropping of anchors within the entrance channel that could occur which could ensnare your proposed subsea cable.

   The project team has received comments from the Hawaii Pilots Association and will continue to engage these and other harbor users regarding navigational safety and other potential impacts. In coordination with this engagement effort, the project team will also develop and implement a Cable Awareness Program as noted above. This information will be reflected in the Draft EA as appropriate.

c. HDOT suggests that you pursue information to understand the potential impact of sea level rise to: a) groundwater inundation and b) shoreline erosion along Kahului Beach Road, to plans for resilient cable and connections to UH Maui College.

   The cable routing and design process specifically considered the potential for coastal erosion and inundation due to sea level rise. The Draft EA will include a discussion of these factors and an evaluation of potential impacts and associated mitigation measures.

d. The site landing occurs on HDOT Property. Hawaiian Islands Fiber Link's designers will need to submit engineered plan drawing details to HDOT for the Horizontal Directionally Drilled Borehole alignment and conduit jackets that traverse through West-Kahului breakwater area when they proceed with engineering designs.

   Preliminary consultation was conducted with HDOT to share conceptual information regarding the project. We acknowledge the need to share more detailed design information and plan to submit engineering drawings for the HDD borehole alignment and related components that traverse the western breakwater of Kahului Harbor.

e. Tax Map Key (2) 3-7-001: 021 is under the control and management jurisdiction of HDOT; therefore, please coordinate with HDOT's Property Management section to secure all necessary land dispositions.

   In addition to submitting detailed engineering drawings, we also acknowledge the need to coordinate with HDOT's Property Management section to secure all necessary land dispositions.

f. HDOT must be consulted on the final design to coordinate project construction with HDOT Harbors Maui District to avoid conflict with storage, cargo, or other harbor-related matters.

We understand the importance and are committed to continued consultation with HDOT Harbors through the construction phase to avoid any conflicts with other harbor uses and activities.

2. Kaunakakai Harbor – HDOT requests further discussion regarding the angle/approach of the cable rising from the seabed to the Molokai Yacht Club. HDOT requests information regarding the location of the cable to the causeway connecting the highway to Kaunakakai Harbor. Such discussion and information will provide HDOT with a better understanding of your plans and Geographic Information System coordinates of the cable, planning regarding the potential impact of sea level rise to Kaunakakai Harbor, and the flow of cargo into and out of this commercial harbor.

   Like the cable landing site at Kahului Harbor, the cable routing and design at Kaunakakai Harbor specifically considered harbor operations and other site-specific factors. The Draft EA will include detailed information regarding the proposed project components at Kaunakakai Harbor and a discussion of potential impacts on harbor operations and facilities.

3. A permit to Perform Work Upon State Highways is required for any work within the State highway right-of-way (Hawaii Revised Statutes, Chapter 264). The application includes the review and approval of construction drawings and a Traffic Management Plan.

   We acknowledge the need for a permit to Perform Work Upon State Highways (including submittal of construction drawings and a Traffic Management Plan) for any work within the State highway rights-of-way.

We appreciate your response and your interest in the HIFL Project. We will keep you informed regarding the Project status and the availability of the Draft EA for review in addition to other subsequent milestones.

Sincerely,

Clifford Miyake

Clifford Miyake
Chief Strategy Officer
Ocean Networks, Inc.